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*The*  
**HARBOUR**  
*of* **MONTREAL**



**ANNUAL REPORT**  
**1914**









Grand Trunk Elevator

Entrance Lachine Canal

Harbour Building

Alexandra Pier

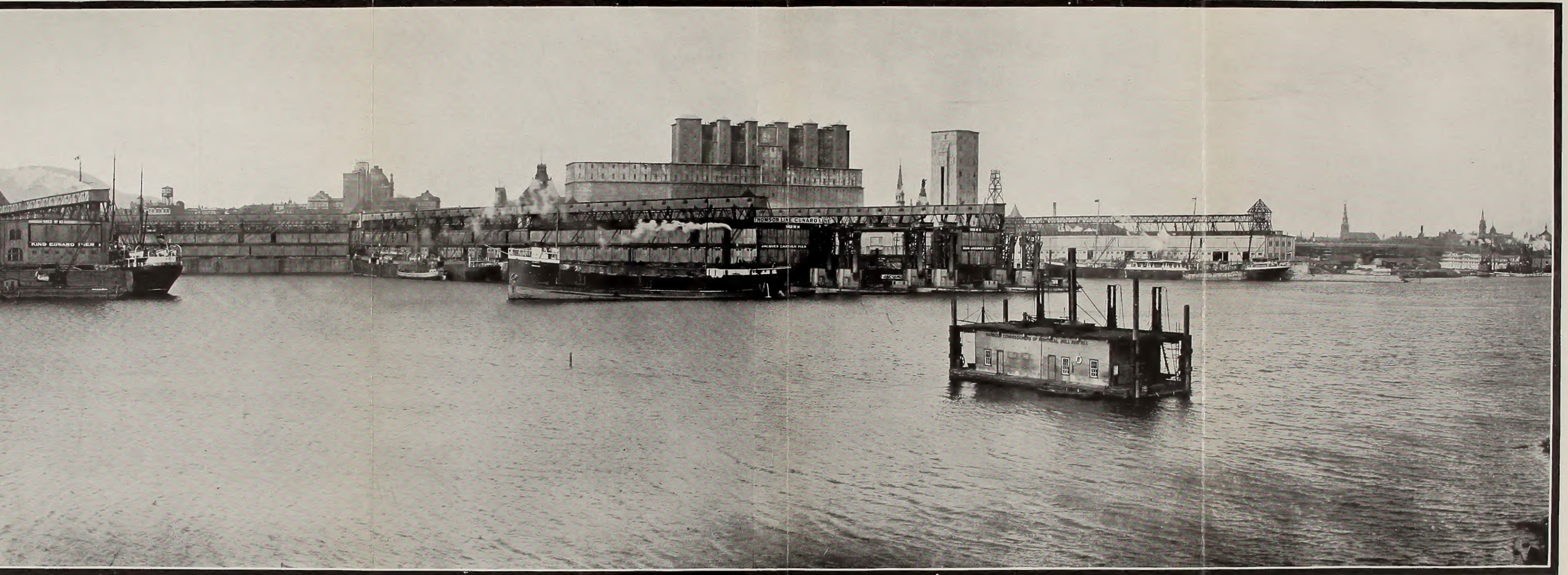
Harbour Elevator No. 1

King Edward Pier



CENTRAL PART OF MONTREAL











Geo. G.  
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Canada. Montreal Harbour Commission

ANNUAL REPORT  
OF THE  
**Harbour Commissioners**  
OF MONTREAL  
FOR THE YEAR 1914



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7/4/15

COMMISSIONERS  
W. G. ROSS, Esq., President.  
FARQUHAR ROBERTSON, Esq. COL. A. E. LABELLE.

[1915]





## OFFICIALS.

MAJOR DAVID SEATH, SECRETARY-TREASURER  
M. P. FENNELL, JR., ASSISTANT SECRETARY

F. W. COWIE, M. INST. C. E., CHIEF ENGINEER  
T. W. HARVIE, ASSISTANT CHIEF ENGINEER  
J. NEHIN, GEN'L SUPT. OF GRAIN ELEVATORS  
GEO. GENDRON, MECHANICAL SUPERINTENDENT

CAPT. T. BOURASSA, HARBOUR MASTER  
CAPT. J. F. SYMONS, DEPUTY HARBOUR MASTER

GEORGE E. SMART, COMPTROLLER

ROBT. A. EAKIN, PAYMASTER AND WHARFINGER

J. VAUGHAN, SUPT. OF RAILWAY TERMINALS  
L. MERCIER, ASST. SUPT. OF RAILWAY TERMINALS

L. H. A. ARCHAMBAULT, PURCHASING AGENT



# Harbour Commissioners of Montreal

MONTREAL, February 15th, 1915

To Hon. J. D. HAZEN, K.C., M.P.,  
Minister of Marine and Fisheries,  
Ottawa, Ont.

Sir,—

In compliance with Section 51 of the Commissioners' Act 57-8 Victoria, Chapter 48, the Harbour Commissioners of Montreal herewith respectfully submit their Annual Report of Operations for the year ended 31st December, 1914, embracing a full account of all moneys by them received and disbursed and describing the improvements made and under way.

We have the honour to be,

Sir,


Yours very respectfully,

W. G. ROSS, President.

F. ROBERTSON,

A. E. LABELLE,

Commissioners.



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# REPORT OF OPERATIONS

CARRIED OUT BY

## Harbour Commissioners of Montreal

1914

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The year of 1914 will be remembered not only on account of the general feeling of uncertainty and extreme business conservatism, due to the financial depression that prevailed during the early months of the season, but particularly by the outbreak of hostilities in the Old World and the gigantic struggle still being waged on the battlefields of Europe.

Notwithstanding this, it is most gratifying to be able to place on record the steady progress made by the Harbour of Montreal during the season which, from a constructive and financial point of view, has fulfilled the expectations of the Commissioners.

### NEW LOAN OF \$9,000,000.

The money voted for the Harbour improvements, outlined under the general scheme adopted in 1909, having been about expended in the fall of 1913, Parliament, early in the spring, voted the capital sum of \$9,000,000, under the Act 4-5, George V, Chap. 41, in order that no delay might be caused in the work of improvement of the terminal facilities of the Harbour,

and to provide for the construction of such additional facilities as are necessary to properly equip the same.

The Commissioners have devoted much time and thought to a careful study of the different epochs in the history of the Harbour, learning therefrom the fact that in almost every case the schemes or projects for the development of the Harbour, adopted at the various steps in its advancement, have been found before completion inadequate, and that further works were necessary to cope with the ever increasing requirements of its commerce and the railway and commercial growth of the country, in order to preserve the prestige of handling Canadian business through the Port.

Profiting by experience, but before proceeding with the general scheme of Harbour Extensions contemplated, for which the aforementioned loan was voted, it was thought that much might be learned by a personal examination of the policies that have been pursued with respect to the principal ports of Europe.

With a view therefore of studying developments in these Harbours, both as to their design, construction, equipment, trade and commerce, as well as to ascertain by what means additional trade could be diverted through the Harbour of Montreal, a visit was made by the President, W. G. Ross ; Chief Engineer, F. W. Cowie ; and Assistant-Secretary, M. P. Fennell, Jr., during the months of February, March and April last, to the following :—

Port of London; Port du Havre; Port de Marseille; Porto di Genova; Der Hafen von Hamburg; Port of Rotterdam; Port of Antwerp; Port of Bristol; Port of Liverpool; The Manchester Docks; Clyde Navigation,



Glasgow; Edinburgh, Leith Harbour; H. M. Dock Yard, Rosyth; Hull Docks and Southampton Docks.

The Port Authorities and their Officials received the Montreal Delegation with uniform courtesy, every facility being afforded to minutely inspect the construction works, equipment and operation of the Ports, and at the discussions which took place during the inspections a great deal of valuable information was gathered as to the results being obtained from the various types of installation; and the latest successful methods and types of construction were closely observed.

Two large volumes, the first containing the maps and the charts of the Harbours above enumerated, and the second containing construction plans and details, were collected and bound, and are now a valuable record in the Harbour Office.

## EUROPEAN PORTS.

All the great world ports, no matter how fortunately situated, or how admirably supplied with excellent advantages, in order to become centres of ocean-borne commerce, have had to be developed through foresight and energy. None could to-day accommodate vessels of modern size unless there had been heavy expenditures made for dredging and channelling, and transformation accomplished through the efforts of those in charge of the Harbour facilities.

Steamship and commercial interests found that there was a lot of work to do, even at the most advantageously situated port, before vast commerce could be encouraged and accommodated.

In the case of most of the great ports visited, nature did a very large amount of the labour in the first instance, it being plain that some localities had been destined to become the meeting point for ships and inland transportation. But in the case of several of the leading ports of to-day, men have accomplished prodigious tasks in assisting nature and establishing ports at points miles and miles from the sea.

The things accomplished at other points may well be considered and well worth a study by those who seek to make of Montreal a great Harbour. A glance at the accompanying statistical table of expenditures, in round figures, made at some of the leading ports will show how titanic has been the amount of harbour development necessary to meet modern shipping demands.

London.....	\$200,000,000	Rotterdam.....	\$ 50,000,000
Liverpool.....	155,000,000	Bristol.....	40,000,000
Hamburg.....	115,000,000	Marseille.....	40,000,000
Manchester....	100,000,000	Havre.....	30,000,000
Newcastle.....	90,000,000	Southampton.....	30,000,000
Antwerp.....	60,000,000	Genoa, 1903-1911...	25,000,000
Glasgow.....	50,000,000	Montreal.....	25,000,000

The Ports named have expended over a billion dollars (\$1,000,000,000) for harbour purposes. At London alone nearly one-fifth of the amount has been used in making the River Thames adequate for the mighty water-borne traffic of civilization's commercial metropolis. The nations of Europe have not hesitated to pay the price of success, for they are alive to the fact that the port which captures trade is the port that keeps its facilities ahead of its demands.



## FACILITIES BRING TRADE.

The ports that are doing the largest business, and doing it most efficiently, are those that have kept their facilities ahead of actual requirements, and conversely the ports that have remained stationary, or have fallen behind, are those whose authorities have had neither the imagination nor the enterprise to plan for the future.

It was found that the features of port administration which most made for success were:—concentration of authority in the hands of one responsible body; a vigorous policy of port development which resulted in providing deep and safe entrance channels and harbour basins, and finally adequate storage accommodation and equipment for the prompt dispatch of business.

Goods can be handled at lowest cost from ship to consignee and vice versa where a single port authority is supreme and has control of the entire operation of harbour and railway terminals, and where transit sheds of modern design, with all the necessary equipment and appliances, are provided.

A special feature noticed at British ports was the facilities provided for the care of perishable products from Canada.

The expansion of Canadian trade, especially in the last five years, makes it imperative that the sea terminals of the country shall be further vigorously developed if Canadian business is to be handled by Canadians, otherwise Canadian trade will go by routes over which this country has no control.

It should be kept in mind that the development of great national ports also develops the trade and com-

merce of the whole nation. A port that has been adequately developed and equipped not only gives a tremendous impetus to the manufactures and commerce of the whole of its tributary territory and builds up its population but is an impetus to the whole country.

### LONDON LEADS.

Of the ports of the Old World London is still the chief in net register tonnage. Despite the wonderful develop-



LONDON—Steamer leaving the Millwall Dock

ment which has taken place at competing ports during the last half century, she still holds her place as the maritime centre of the globe. She has maintained that position because of her advantageous situation as a distributing centre and the large consuming power of her densely populated surroundings.

The following statement of the value of the imports and exports (excluding coastwise goods) of the United



Kingdom, as a whole, and of the six leading ports, for the year ended 31st December, 1912, shows the importance of her position in relation to the foreign trade of the country:—

United Kingdom.....	\$6,718,008,805
London.....	1,918,145,260
Liverpool.....	1,866,827,575
Hull.....	401,732,035
Manchester (including Runcorn).....	283,589,845
Southampton.....	260,550,310
Glasgow.....	253,825,905



LONDON—Grain Warehouse, Surrey Commercial Docks

In spite of this commanding position, diversity of interest and multiplicity of authority at one time threatened the diversion of her water commerce to Liverpool, Hamburg and Rotterdam. Confusion of authority in the port administration, due to its being vested in several bodies, raised such a cry that a Royal Commission was appointed which found that complaints made were not without foundation, and were largely due to want of centralization. This investigation resulted



LONDON—Shipping in the Tilbury Docks



in the Port of London Act, 1908, which transferred to a body called "Port of London Authority," the property and powers and obligations of the London and India, Surrey Commercial and Millwall Dock Companies, as well as those of the Thames Conservancy Commission, and the Watermen's and Lightermen's Company.

By far the most important was the London and India Docks, which owned 430 of the 640 acres of water in the London Docks, and 106,000 feet of the total of 143,000 lineal feet of the quay. The Estate covered 1,800 acres, and 15,500,000 square feet of shed and warehouse floor space, capable of caring for nearly 1,000,000 tons of goods at a time.

The port since being placed under one undivided control has shown new life and expansion.

The port facilities are very extensive. From London Bridge, above which sea-going vessels do not pass, to Tilbury Docks, nearly 26 miles, the Thames is a harbour. About one-half of the shipping coming up the Thames discharges in the river itself at moorings in the stream. The other half discharges in the docks where the larger vessels unload or take on cargo. These docks are of massive construction and equipped with excellent handling facilities.

The lighterage trade of the Thames is the most characteristic as well as the most picturesque feature of port life at London. Vessels anchoring in the river or docking at any quay may be served by barge or lighter. These craft swarm around a great steamer and take its cargo for delivery to any warehouse or quay on the whole water front of London Harbour. There are over 12,000 of these lighters and barges in commission, ranging from 70 to 200 tons. They are sufficiently

small to go under the bridges and so serve the upper river. The River Thames is lined on both banks with warehouses and fringed with these barges at all times.

### PORTS OF INTEREST.

Two of the great ports whose developments may be looked upon with particular interest are Glasgow and Manchester. These offer instances of ports not gifted by nature with the facilities to enable them to become centres of sea-borne commerce, and which now rank among the great ports by reason of the acumen of their business men, engineering feats and the outlay of large sums of money.

### PORT OF GLASGOW.

Take the case of Glasgow. A century ago she was an unimportant town with no harbour, the Clyde being



GLASGOW—The River Clyde

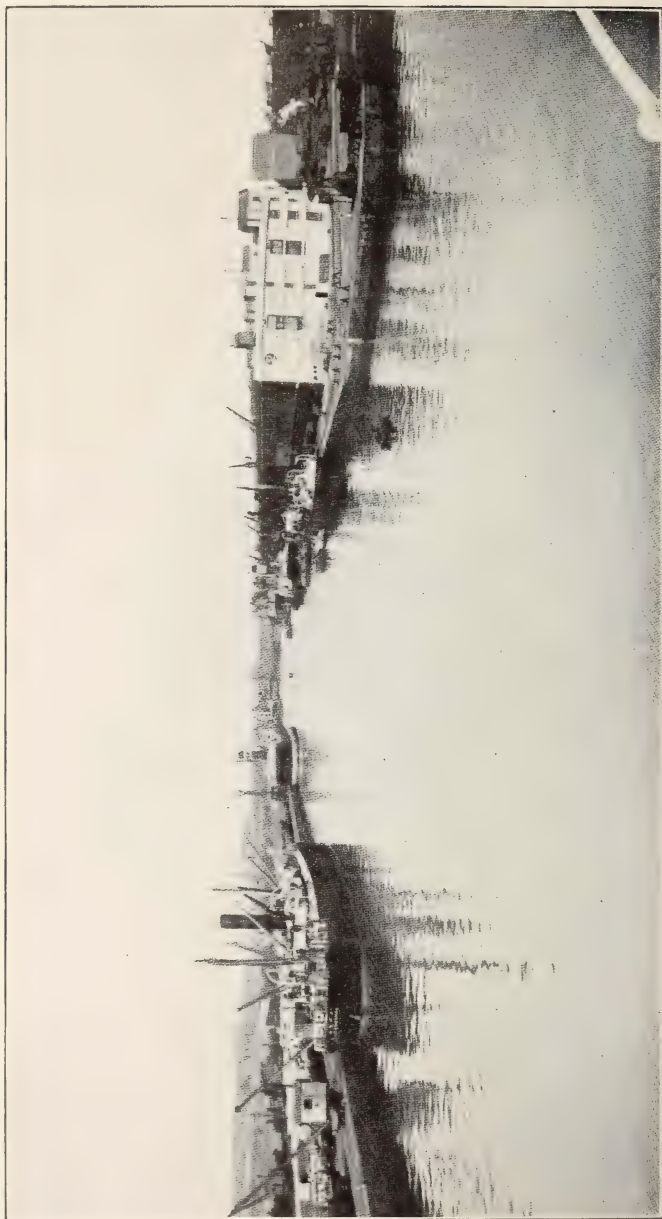




GLASGOW—River Passenger Terminal

in places 15 to 18 inches deep, and fordable for twelve miles below Glasgow. To-day Glasgow besides being the first commercial city of Scotland is one of the important ports of the United Kingdom. The Clyde is one of the great navigable highways of the world, 33 feet deep at high tide, its creation as a carrier for the largest ships being a noteworthy achievement of the engineers, as well as permitting battleships, men-of-war, and vessels of the Lusitania mercantile class to be constructed along the river.

The harbour is situated in the heart of Glasgow. Twenty-five miles below, the river opens into the Firth of Clyde, which makes easy navigation into the North Channel and the Irish Sea. The port facilities of Glasgow are of the best. Berthage is supplied on either bank of the Clyde, 45 per cent. of the total harbour, and in specially constructed docks or tidal basins, 55 per cent. The tidal range of eleven feet does not require the construction of expensive gates and locks. The total quay



View of No. 9 Dock—Manchester Ship Canal

front is about 10 miles, and about 50 ocean-going vessels can be accommodated with berths and sheds at one time. The sheds are one and two storeys high.

The development of the port has made possible the development of the hinterland, and has invited great industries, particularly shipbuilding, which otherwise could have never been established.

### PORT OF MANCHESTER.

Manchester again offers an example of what can be done in the way of outmanoeuvring nature and making a seaport to order. Feeling the strain of competitive conditions imposed by the transfer charges through the Port of Liverpool and the rail from that point, the business men of Manchester, in 1885, determined upon building a ship canal which would make the Port of Manchester a reality. In 1893 the canal was finished and opened for traffic to Manchester.

The canal is  $35\frac{1}{2}$  miles long with a depth of 28 feet of water, and the docks are only  $54\frac{1}{2}$  miles from the sea. To make this cut it was necessary to excavate 51,000,000 cubic yards or over half the amount of excavations of the Suez Canal. The cost was approximately \$85,000,000.

The result of the construction of the canal has made this inland manufacturing centre of England one of the world's ports.

The Manchester Docks extend over an area of 400 acres, within which is included a water space of 120 acres, a quay length of 7 miles, and a quayage area of 286 acres. Practically the canal is one vast inland dock, as loading or discharging can be effected at any point. The docks vary from 560 to 2700 feet in length, one great



advantage being that vessels can move from one to another irrespective of tide or weather. The smooth water space available for barging, rafting, etc., is practically unlimited. There are 13 single-floor, 1 two-floor, 6 three-floor, 5 four-floor, and 12 five-floor transit sheds, fitted with the most modern appliances

The port is in direct communication with the inland navigation systems of the country, an essential element in the cheapening of transport.

As the entire harbour development of Manchester has been carried out since 1890, the experience of other ports has been used to the utmost, with the result that Manchester has one of the most up to date harbours in Europe.

A feature of special interest to the visitors was the construction, about completed, of a large modern grain elevator.



MANCHESTER—Elevator No. 1. Capacity 1,500,000 Bushels

One of the most fortunate features of the port is that the land available for the building of the vast factories which are gradually springing up along the banks of the canal is practically unlimited. The development of the port can never be impeded by want of space, as has that of so many other ports. The effect of the canal in placing manufacturers in contact with raw materials direct ex-ship and providing for shipment from the factory doors to all ports of the world of the finished article, must prove in the long run of inestimable national benefit, and constitute a most powerful factor in enabling the manufacturers of Great Britain to compete in the markets of the world.

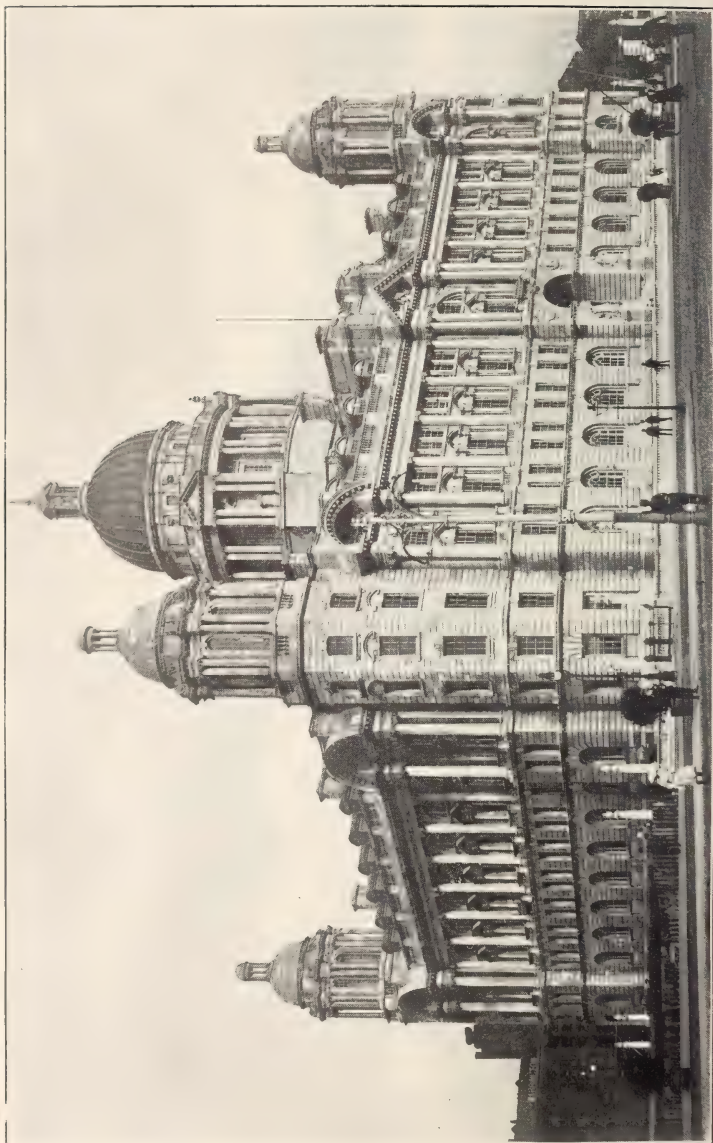
### **A TRUE WORLD PORT.**

When the ports of the world are under discussion there is one which would spring to the lips of the average man, as typifying a true world port, far quicker than any other. That is Liverpool.

As in the case of London, to Liverpool come ships in vast numbers from every sea and from vast lands, and though in Liverpool there are docked fewer ships than enter London, Liverpool is ahead of London as a great passenger port, as is also its export business.

In Elizabethan times, Liverpool's maritime commerce showed 15 ships annually, with a total tonnage of less than 300. This has grown to 25,000 vessels in 1914, with a tonnage of 19,000,000 tons.

Liverpool now handles about 80% of the entire cotton trade of Great Britain, in addition to which it handles grain, wool, timber, tobacco, sugar, provisions,



Mersey Docks and Harbour Board, Liverpool. View of General Offices from Landing Stage



cattle and fruit in large quantities. The total area of the docks and basins in Liverpool and Birkenhead is 600 acres, with a lineal quayage of over 36 miles, and they are arranged to accommodate every kind of craft, from the canal barges that frequent the tidal basins to the Atlantic liners that tower over the river walls in the deep docks. The whole of the Liverpool docks are artificially constructed.

The port possesses the largest grain dock in existence, as well as the largest single warehouse. The tobacco warehouse at Stanley Dock is 723 feet by 165 feet and 13 storeys high, constructed of brick, with steel beams and posts, and concrete floors. It has a capacity of 66,000 hogsheads of tobacco. There are many other great warehouses for salt, wool, hides, oil, etc., and from all of these the Port Authorities derive an income.

The special passenger facilities provided at Liverpool, because of her enormous passenger trade, are so well known that a description of the same is not necessary.

The development of this great port has not, however, been accomplished without much expense and infinite labour.

The makers of Liverpool as a maritime centre confronted and solved the problem of establishing a port in the face of a tidal range of 31 feet, the silting of the estuary and the shifting of sands on the submerged delta.

It is the policy at Liverpool to keep ahead of the present demands of commerce.

The administration of the Port of Liverpool is in the hands of a public trust called the Mersey Docks and Harbour Board, established in 1857, consisting of 28



LIVERPOOL—Canada and Huskisson Docks

members, of whom 4 are appointed by the Crown and 24 are elected. It is considered the highest honour a man may earn to be given a seat on the Board.

In order to provide accommodation for vessels of exceptional size the Board has lately constructed the new Gladstone dock, which is intended to be used as an ordinary wet dock as well as a dry dock. The dimensions of the dock are:—

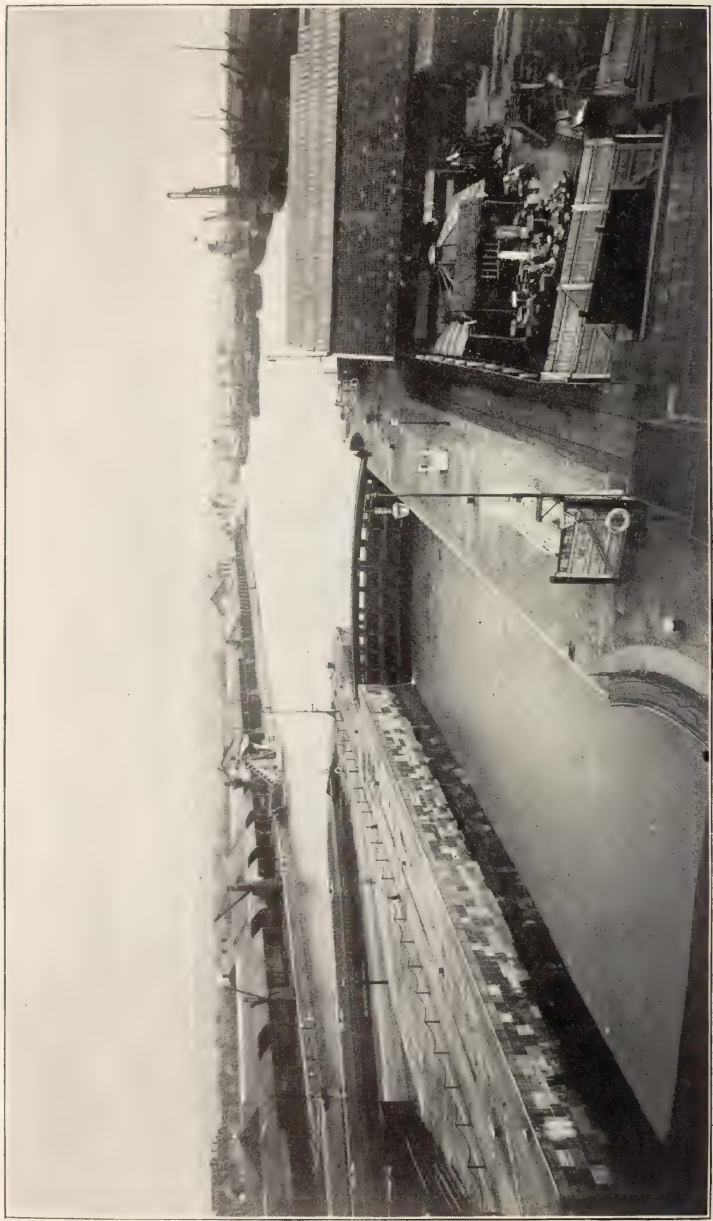
Length.....	1,050 feet.
Width of entrance.....	120 “
Depth of sill, below old dock sill.	25 “
Water area.....	3,534 acres.
Shed area.....	10,000 sq. yds.

This dock is only part of a scheme which includes a vestibule or large half tide dock, with a river entrance lock, 1,070 feet long and 130 feet wide. Off this half tide dock are being provided two branch docks, having four quays, which will accommodate four vessels, each 1,100 feet long. These docks will be equipped with shed accommodation of the best and most modern kind, and the work is estimated to cost \$9,000,000, and is being rushed to completion as energetically as possible.

The absolute necessity of utilizing to the best possible advantage every inch of space in the port has been the special and successful study of the Dock Board. Most of the old docks have never been allowed to become obsolete, but have been enlarged, deepened and improved to keep them thoroughly abreast of the times.

The revenue of the port for the year 1913 amounted to \$10,475,000.





BRISTOL—Avonmouth Docks

## THE PORT OF BRISTOL.

Bristol, for a thousand years, has been one of the most famous ports of Britain, John and Sebastian Cabot having set sail from her wharves to discover the new world. This was the port in which the first steamship to cross the Atlantic was built and whence she sailed. During the days of the slave trade, British merchants amassed vast fortunes and acquired a practical control of the West Indies, and to-day still flourish great cocoa and sugar factories started in these old days.

But the town of Bristol was six and a half miles up the little River Avon, and when, last century, the ships began to increase in size by the introduction of steam and steel, the Port of Bristol did not make provision for the larger craft. As a result, trade dwindled.

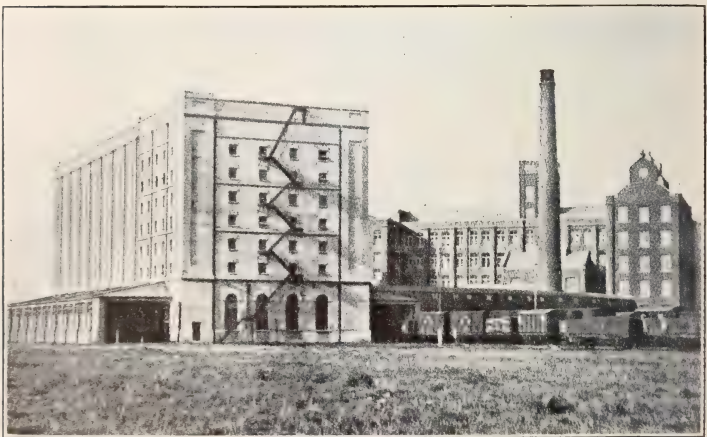
With a river so narrow and so great a range of tide, 40 feet, it was out of the question to dig the river deep enough to bring the great ships up to Bristol. It was realized that the new docks must be built at the mouth of the Avon. This has been accomplished and the wonderful works that have been built are a tribute to the municipal spirit and the determination and capacity of the people of Bristol.

The port consists of three different centres, viz., the City Docks, Portishead and Avonmouth. The Portishead Docks are specially fitted to handle the grain and lumber trade, 10 acres of splendidly equipped stacking ground being available for timber. A wharf has been specially constructed on the west side of the dock for timber, 600 feet long, equipped with railways and quick-working cranes, all being provided with a view of expeditiously and economically handling wood goods. These

docks are also used for the storage of motor spirit, there recently having been erected five tanks with a capacity of 3,000,000 gallons.

The Avonmouth docks are situated seven miles from the city at the mouth of the river, and are protected from the open sea by massive sea-gates and lock entrances, and provide facilities for the largest ships, both passenger and freight. The shed accommodation contiguous to the quays is over 1,400,000 sq. ft. (31 acres) in extent. A fruit store and warehouse has been provided for the West India trade, giving ample storage space for fruit and miscellaneous cargo.

Bristol is specializing in the provision of facilities for the handling of Canadian products, large lairage and slaughter houses, having accommodation for 1,000 cattle and 500 sheep, cold storage warehouses, as well as grain elevators of the most approved type, being erected at Avonmouth. Two floating elevators, each capable of dealing with 120 tons of grain per hour, ensure the rapid



Granary and Flour Mills, Royal Edward Dock, Avonmouth



discharge of vessels laden either with grain or mixed cargoes.

Oil tanks of a capacity of 12,000,000 gallons, as well as two tanks, with a storage capacity of 5,000 tons for the reception of molasses in bulk, have also been located at these docks, Avonmouth having proved to be a most convenient centre for the distribution of these commodities by either rail or water routes.

Since the completion of the Royal Edward Dock passengers are landed in London two hours after their arrival from the sea. As a distributing centre, Bristol's position gives it an extensive serving area in all directions. Its splendid dock accommodation and rail and water connections afford exceptional advantages for the handling of merchandise to and from all parts of the Kingdom.

## **BRISTOL TRADE REPRESENTATIVES.**

On July 15th, a visit was made to Montreal by Mr. Henry L. Riseley, who has rendered invaluable assistance in every manner possible toward the development of closer commercial relations between the Port of Bristol and Montreal. He was accompanied by Mr. E. Manning Lewis, Commercial Superintendent of the Port. They were on their return from a mission around the world with the object of bringing about increased trade between the Port of Bristol and the overseas Dominions, and it is hoped that the efforts of these gentlemen will be productive of much success in view of their providing such excellent facilities at their port to handle Canadian products.

## SOUTHAMPTON DOCKS.

The Southampton Docks are situated at the head of Southampton water, the location of which is recognized as being particularly favourable on account of its sheltered position, its moderate range of tide, its navigable depth and the long period of high water. The harbour also has the advantage of being fairly free from silt.



S.S. "Ascania" leaving Southampton

The position of these docks relative to the ocean routes to all Eastern home ports, as well as the large North Sea ports, together with its sheltered position, has made Southampton one of the most important Ports of Call in the world. Its railway connection with London gives it further advantages, and although there are no large manufacturing or commercial centres in the vicinity of Southampton, the docks, owned and operated by one of

the great railway companies of Great Britain, give an excellent idea of a successful railway terminal and steamship port of call.

The docks were formerly owned by the Southampton Dock Co., but in 1892 they were purchased by The London & South Western Railway Co. The dock estate consists of a triangular piece of land of 239 acres in area.

The maximum tide is about 13 feet and the navigable depth of water is reported to be 35 feet at low water.

Some of the largest British shipping companies have made this their home port, and as a port of call for the very largest ships afloat Southampton is well known.

The control of the docks is entirely vested in the railway company and the enterprise is therefore purely and simply a commercial one.

The construction problems in Southampton are most interesting from an engineering point of view, many of the types of construction being unique.

Southampton has had a very difficult task in the last few years in keeping up with the size of modern vessels. The construction plant has been engaged working day and night in order to prepare for the arrival of the new White Star steamships and also of the later and larger German liners. Different types of quay walls have been designed and constructed, and although great difficulties have been experienced in foundations, a very admirable system of harbour accommodation is now available.

The facilities provided in the port are, to a large extent, of a special nature, as required for railway operation of the terminals and for vessels calling for the landing



of passengers and small portions of cargoes, as well as for home vessels.

The entrance is reported to be exceedingly well lighted, making the docks accessible both by day and by night.

Recently a large new basin of 16 acres has been constructed, giving wharf accommodation for four of the largest vessels in the world at one time.

There are four dry docks of varying lengths, from 280 feet to 520 feet, as well as two large new graving docks, one 745 feet long and the other 897 feet long.



HULL—Grain Warehouse and Cold Store

## THE PORT OF HULL.

The Hull Docks and riverside quays are situated on the north bank of the River Humber, about 20 miles from its mouth.

The river and navigation features are under the authority of the Humber Conservancy Board.

The harbour and docks are practically entirely owned and operated by two dock-owning railway companies,

viz.—The North Eastern and The Hull and Barnsley Railway Companies.

Hull lays claim to be the third port in the United Kingdom. Accommodation is provided for all description of traffic, special features being facilities for handling grain, timber, coal, fruit, fish, meat and provisions. Steamers arrive and depart at all stages of the tide.

Coal is shipped from about 400 collieries through Hull.

Hull is particularly well sheltered and the tide is very similar to Quebec, springs rising 20 feet and neaps 16 feet.

The system of docks situated along the banks of the Rivers Humber and Hull are very extensive, and, being owned and operated by railway companies, are exceedingly well supplied with railway terminals and facilities.

The two railway companies, each owning their own docks and terminals, have for many years vied with each other in giving exceptional accommodation so as to attract trade. This competition was in many ways successful in giving the well equipped port, but did not lend itself to further extensions.

The latest extension, however, is called the "New Joint Dock," and when visited in April, 1914, it was almost ready for use, and it was actually opened by His Majesty the King on June 26th, 1914.

This dock has a water area of 53 acres and has a total length of quay of over 8,000 lineal feet, provision being made for future extension.

The entrance lock is a magnificent work of construction.

The most modern appliances and accommodation are provided, including electric coal conveyors, fixed and travelling coal hoists, electric cranes, commodious warehouses, three large graving docks, and a large modern grain elevator was under construction.

### PORT OF HAMBURG.

Hamburg, one of the States of the German Confederation, which has the largest tonnage of any port



HAMBURG—Hamburg-American Line—Kaiser Wilhelm Harbour

on the Continent, excluding the British Ports, is 65 miles from the sea up the River Elbe. The city is the farthest inland ocean navigation point of the river. Meeting the ocean traffic is a canal and river system of water distribution. Main lines of railway, running through the German Empire, also converge at Hamburg.

The first steps to make Hamburg a great world port



were taken in 1881, when the State began to acquire land for the development of a port. For seven years the acquiring of land continued, plans in the meantime being drawn up for the port construction. In 1888 a well defined scheme of harbour extensions was entered upon; 2,500 acres of acquired property were used for the provision of adequate water and pier areas, equipped with transit sheds, cranes and warehouses.



HAMBURG—Kaiser Wilhelm Harbour. Auguste Victoria Quay

Up to date about \$115,000,000 has been expended on the Port. Development, however, still continues, a sum of \$11,250,000 having been appropriated by the Senate in 1914 for the construction of several sea and river basins at Ross-Neuhof and Waltershof, which, on completion, it is expected, will satisfy in every manner the demands of modern navigation. The fact that the River Elbe is tidal and of a sandy nature, with vary-

ing channel depths, makes continual dredging compulsory.

The Harbour of Hamburg has room for 500 sea-going vessels, and consists of a series of tidal basins, which, together with the remaining area of water in the harbour available for sea-going vessels, cover a superficial area of 625 acres. River craft has an additional area of 330 acres, and the small canal and inlets leading



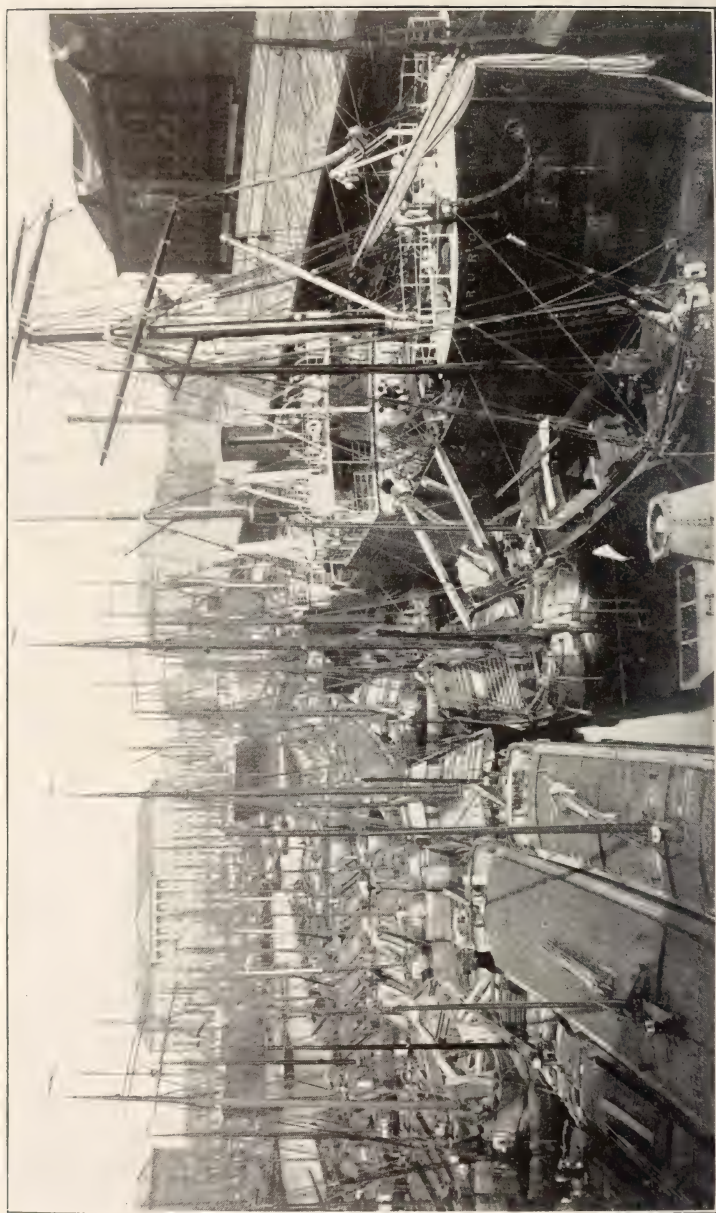
HAMBURG—Harbour for Sailing Vessels

to different parts of the town amount to 353 acres more, or a total of 1,308 acres. In addition, the use of water berths or dolphins double the berth accommodation of the port. One of the special features of the scheme of development of Hamburg is the existence of an auxiliary port, Cuxhaven, 56 miles down the river, for the accommodation of the big Atlantic liners whose size prevents their coming up the river without first discharging a por-

tion of their cargo to reduce draft. The tide at Hamburg has a range of only  $6\frac{1}{2}$  feet.

A very strong feature in the administration of Hamburg is that of the Free Harbour, which consists of an area covering about seven-eighths of the harbour area of the city, but is treated as a separate country in the matter of tariff. Goods coming into it or going out of it pay no customs duty. The area is cut off from the rest of the city by high walls or barriers, every entrance and exit being guarded. Goods pass into Germany through the hands of customs officials, and the customs laws of Germany apply. Goods from this area go out by sea to all the earth unhindered, so the raw materials come in free to factories maintained within the walls and the finished product goes out by sea unhampered by tariff imposition. Goods may be stored in the warehouses any length of time, and reshipped without the payment of duty. If shipped to any point in Germany the duty is paid only at the time of delivery from the free harbour. The privilege of storing whole cargoes duty free, from which small orders may be delivered at any time to suit the customer, has been of inestimable advantage to the merchants of Hamburg. In the free harbour ships may be repaired, using duty free material and home labour. As a consequence, Hamburg has the greatest advantage of all the ports of Europe in the trans-shipment business.

Because of these great advantages an extensive warehouse business is done in the free harbour. Large factories are also there established, and the largest shipbuilding plants in Germany are within its limits. Those of Blohm & Vofs were visited, the latest Hamburg-American liner, the *Vaterland*, being inspected on the stocks.



ANTWERP—View of Port and Basins



## ANTWERP.

Another continental port on which a vast sum of money has been spent is Antwerp. It has been claimed that it is one of the best equipped ports in northern Europe. The port is situated on the River Scheldt, 55 miles above the entrance from the North Sea. In ascending the river the first 40 miles are through Hol-



ANTWERP—View of Port

land. Two countries are therefore concerned in the approach channel to Antwerp, viz., Belgium and Holland, and this fact has had some effect in retarding improvements of the channel. Continuous dredging at the Port of Antwerp is needful to maintain sufficient depth and width of channel.

All navigation of trans-oceanic vessels is with the tide. There is always the possibility of delays and

danger from ice in winter, but this is also shared by competitive ports.

The aids to navigation are much inferior in efficiency and permanence to those in the St. Lawrence, the gas buoys, though numerous, not being at all equal to the standard adopted in the Canadian rivers and navigable channels.

The administration of Antwerp is municipal, though a small part of the river front is owned by the State. The total wharfage of Antwerp is 18 miles, riverside quays being capable of accommodating 40 vessels at one time. There are, on the average, about 200 sea-going vessels in port at one time, and around 1,500 barges, lighters, etc. There is here an excellent service in sheds and cranes. The sheds, about 360 by 195 feet, one storey, stand well back from the edge of the quay, and those along the city front have the roof made into a broad promenade overlooking the river and shipping. The city owns and operates 12 floating grain elevators, as well as the warehouses in the port, which are constructed of ferro concrete.

Demands on the port accommodations have been so heavy that the authorities have planned a marvellous scheme of harbour extensions, which, if carried out in full, will make Antwerp one of the finest harbours in the world. In 1906 an extension scheme was proposed making provision for a series of basins approached by locks, as well as for the cutting of an entirely new bed for the river, at an estimated cost of \$55,000,000. The Belgian Government have adopted the scheme, with the exception of the Grand Coupure, and the first two docks

have just been completed, the remaining seven to be constructed as requirements of trade demand.

Antwerp's inland waterways have had a phenomenal development. There are over 1,200 miles of canals in Belgium alone, and these canals join as in one great system with those of Holland, France and Germany. All the transportation interests focus upon the harbour, and conditions are thus ideal for the development without friction of all the agencies of transportation.

### ROTTERDAM.

Still another of the great ports which is not on the sea is Rotterdam. This port is situated on the Meuse, tributary of the Rhine, 19 miles from the ocean. Connection with the sea is made by a channel completed in 1896 and known as the New Waterway, constructed at a cost of \$9,000,000, giving a depth of 28.8 feet at low water up to the quays at Rotterdam.

Rotterdam carries on a vast shipping business with the entire world. It is also growing very rapidly as a port of trans-shipment for northwest Europe, sharing in this trade with Antwerp and Hamburg.

The records of Rotterdam's trade show that ocean traffic has more than doubled in fifty years, but it shows also that the internal water traffic is multiplying itself by six in twenty-seven years. This is most illuminating as showing what development and water-ways can do.

The river flows through the town and forms practically one large harbour basin. The current is slight and the tidal range only about four feet, hence no gates or

locks are necessary. Along the river on either bank are quays and havens, or basins opening off from the river.

New basins and docks have been added from time to time in the last twenty-five years, but, as at Antwerp, the demand for docks and anchorage presses upon the supply. To meet this demand, the Wallhaven, a new great basin, has been built on the left margin of the Meuse, to the south-west of the town towards the sea.



ROTTERDAM—Wilhelmina Quay. Allotment of Holland-American Line

This addition has more than doubled the water area of the port.

Rotterdam is admirably equipped with plant for loading and unloading vessels, including cranes, hydraulic lifts, floating hoists, coal tips and thirty floating grain elevators, with a capacity of 180 to 200 tons an hour each. The placing of flour mills directly on the banks of the harbour, to which are attached their own warehouses, present great advantages over other ports



for the handling of wheat from the ship until it is manufactured into flour for domestic consumption, or for export.

Rotterdam has grown rapidly as a port of trans-shipment for north-west Europe, occupying a position at the mouth of the Rhine, and sharing this trade with Antwerp and Hamburg. Her inland and local shipping have increased by leaps and bounds, so that, includ-



ROTTERDAM—Pneumatic Floating Grain Elevators

ing the Rhine shipping, over 80% of which is directed to this port, there entered in 1912, 137,000 vessels with a tonnage of 29,000,000 tons, as compared with the following:—

1890,	71,000	vessels,	7,000,000	tons.
1900,	97,000	“	15,000,000	“
1910,	128,000	“	26,000,000	“

The increase in the Rhine traffic has given rise to a special type of boat, the Rhine boat, very long, very

flat, and with a surprisingly shallow draft. These boats are made of steel, the largest ones being over 460 feet long, with a carrying capacity of 3,500 tons of goods, and a draft of 9 feet, when fully loaded. Up to Cologne the River Rhine has a channel of 9 feet 9 inches and 6 feet 6 inches up to Mannheim. These boats go tandem, from two to five in a string, drawn by a tug or by one of their own number, supplied with power. Services



Largest Rhine River Lighter

exist from these Rhine towns to the seacoast towns of Europe, and thus Cologne and Ruhrort become sea-ports doing business with St. Petersburg, Stettin, Kiel, Hamburg, Bremen, London, etc.

The prosperity in the shipping business of the port is exemplified by the activity that has characterized the Rotterdam building yards, from which 14 cargo and passenger steamers, measuring 42,000 gross register, were launched in 1913, besides numerous river craft, tug boats and dredging apparatus.

## PORT OF HAVRE.

The French Ports of Havre and Marseille are two other continental ports which may be studied with interest by Montreal.

Havre is the only French port on the English Channel whose docks can be reached by the largest Atlantic liners at all stages of tide, and thus it is really the passenger port of northern France. The port is at



LE HAVRE—Breakwater and Promenade

the mouth of the Seine, and is not excelled by any continental port in geographical situation. It is on the open sea, in the direct path of the great liners and continental steamers, and is the natural distributing point for central European trade. The sea channel at the entrance of the harbour has an outside width of 984 feet, with a minimum depth of 29 feet 6 inches. The port itself consists of an outer and inner harbour, protected



LE HAVRE—Entrance of the Port



LE HAVRE—Commercial Basin



from the sea by long masonry arms. The water area of the outer harbour comprises 195 acres. There are ten inner basins with a combined water area of 200 acres, and with 40,500 lineal feet of quay.

The present development of the port was only accomplished after years of neglect. Immediately upon better facilities being afforded to shipping, the trade jumped forward and the tonnage doubled in a comparatively short time. One of the finest lines of trans-Atlantic vessels, the French Trans-Atlantic Co., has Havre as its home port, and their terminal, where passengers are landed, is the finest in existence.

The sea approaches to the port are marked with some of the finest lights in existence. The one on the Cap de la Heve has 2,500,000 candle power, and can be seen in clear weather for a distance of 52 miles. Considerable expenditure is being made on the development of this port.

## PORT OF MARSEILLE.

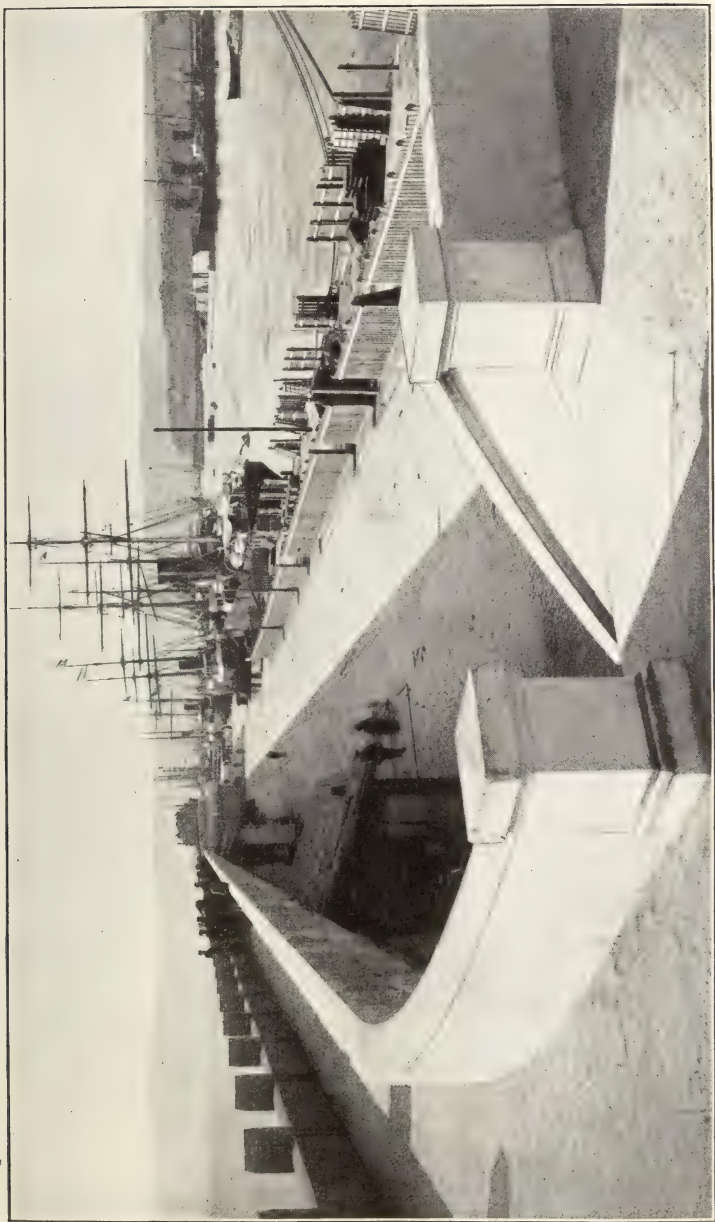
Marseille is another port with important natural commercial advantages because of its situation in relation to the south of France, Italy, the Black Sea, Morocco and Egypt, and the Mediterranean trade.

The port is a purely artificial one. Owing to the fact that Marseille is surrounded by mountains that slope rapidly down to very deep water, construction works of massive and costly design have had to be undertaken. While the expenditures have been large, the results achieved have made them well worth while.

Marseille has always been handicapped by limited railway facilities to connect with the interior of the



MARSEILLE—Joliette Quay and Basin



MARSEILLE—Breakwater, showing Massive Construction and Promenade

country. A new railway, however, is being built, which will remedy these conditions; but, what is of more importance, a tunnel canal is being cut through the Rove Mountains, which will connect the port with the vast trade that is carried on in the interior of France, particularly on the River Rhone. The amount to be spent on this enterprise is \$14,200,000.

Marseille is alive to her great opportunities and is planning an extensive development which will include a series of magnificent basins of great depth, having a splendid entrance from the west. The artificial break-water or embankment, which requires to be of massive dimensions to resist the heavy pounding of the seas, is being constructed in water of an original depth of 100 feet.

Modern development of the port dates from 1853. The total length of wharf accommodation is 12 miles. The available depth for vessels vary. In the centre of the basins there are 20 feet, and as much as 60 feet in the new basin de la Pinede.

Marseille having lost some important commerce by not possessing adequate harbour accommodation in the past for large vessels, has been awakened to her port situation, and has learned the lesson—"business follows facilities."

## THE PORT OF GENOA.

Genoa, Italy's principal port, lies in the centre of the beautiful Italian Riviera, stretching eastward to Spezia and westward as far as Monte Carlo, being situated on the northern coast of the Mediterranean near the middle of the Gulf of Genoa.

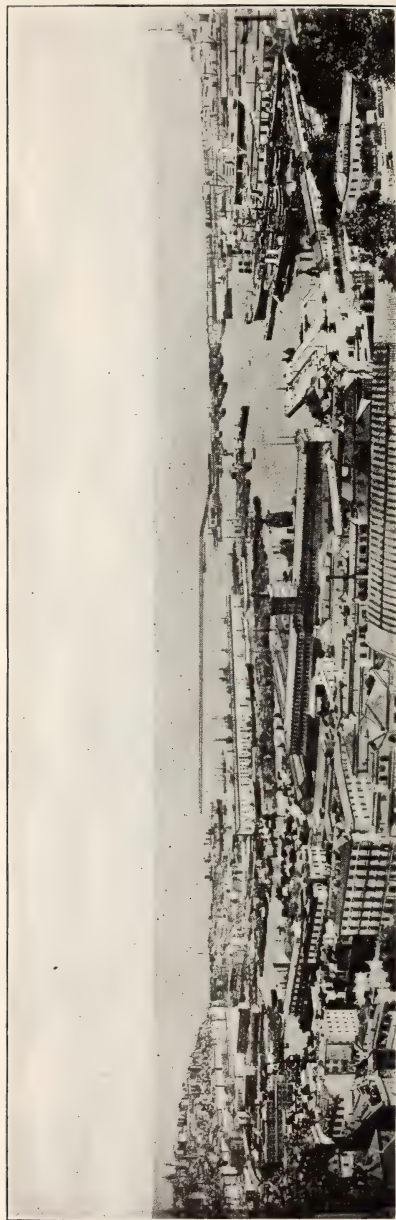


Genoa has for centuries been an important trading centre, and its present growth and development have not only maintained its position as Italy's chief port, but have made it one of the busiest harbours in the world. Its most formidable rival for the trade of southern Europe and the near East is the Port of Marseille. But in addition to French rivalry it has to face the competition, to some extent, of the other Italian ports, notably Venice, Naples, Savona, and Leghorn.



GENOA

Genoa, like most of the great ports, has found in recent years its port accommodations quite inadequate to grapple with the problem of increased shipping. Very large docks have been constructed and projected to meet its expanding requirements. During the eight years ending 1911, \$8,000,000 have been spent on improvements, including railway plant and the construction of a tunnel from the jetties at Sanpiero and



GENOA—General View of Port

the new docks at Chiopella, and above all the establishment of a central electric station and coal-lifts. In 1910 a contract for completing the new Victor Emmanuel III Dock and lengthening of the Galliera breakwater was let for \$6,226,000.

The port comprises an outer and inner port with a depth of water in the basins varying from 29 to 70 feet; 157 berths, 29 of which are reserved exclusively for coal, the others being for ships carrying general merchandise. There are also numerous dolphins for anchoring near the Galliera breakwater.

The Port of Genoa, besides being a large shipping point for goods to and from Switzerland and central Europe, imports large quantities of raw materials gathered from local points on the Mediterranean and from distant ports of the world. As the result of a campaign for the encouragement of trade, especially since the reorganization of the Port Authority in 1903, the increase of traffic in the 30 years from 1880 to 1910 is recorded as 500 per cent.

The result has been that new railways have been required, with better grades. Manufacturing has received a great impetus, and as a result of the construction by the Port Authority of large cotton, grain and produce warehouses, Genoa has become an important collecting and distributing centre, which is the most successful phase in port development.

The establishment of new lines of shipping to South America has had excellent results both to the port traffic and to transportation routes inland. The trade in frozen meat from the River Plate, in cotton and in grain has become of very great importance. The granary or

grain elevator is one of the largest, most modern and best equipped on the continent of Europe, and in many features, the facilities for the unloading of vessels, handling of grain, bagging and shipping to points of consumption, are judged to be worthy of close comparison with similar facilities in Montreal.

The direct revenues of the port are not sufficient to pay for the establishment charges. The Government of Italy contributes a considerable sum per annum, reckoned on the amount of goods exported and imported, with a minimum of \$200,000.00, and the districts surrounding the port, which are directly benefited, pay a certain amount, according to their distance from the port, population and industrial success derived therefrom.

The port is situated, like Marseille, on one of the bold coasts of the Mediterranean. The natural bay which forms the present harbour, protected by breakwaters, is entirely developed. The project of extensions now under way calls for a new outside breakwater to be built in a depth of 20 metres, and the formation of the large basin, Victor Emmanuel III, designed to have a navigable depth of 38 feet.

The construction of the new extensions will give magnificent accommodation for large vessels, and in connection with this work, the harbour, terminals and railway approaches are among the principal valuable features of design, which cannot fail but be beneficial to the general scheme of making Genoa the principal port on the Mediterranean for Central Europe.

The construction of the breakwater in its exposed position calls for great skill and experience in the design of the structure, as well as its construction.



The success of this port may well be studied by authorities interested in the development of the Port of Montreal, and the trade of Genoa, coupled with that of Marseille, would appear to offer very attractive advantages to an interchange of shipping with Canadian ports.

Genoa's success can be attributed to the vigorous policy of harbour development of recent years; to its commanding position on the Mediterranean which permits it to share in the trade of the near East as well as of North and South America; and to the enterprise of shipping companies, particularly the German and Italian. These factors, combined with the wonderful development of Italy's national life during the last 25 years, account for the great development of the port.

### **CANADIAN TRADE COMMISSIONERS.**

The Delegation were greatly impressed with the able and effective work done by the Canadian Trade Commissioners, particularly in Hamburg and Rotterdam, and the Minister of Trade and Commerce is to be congratulated, not only for the idea of establishing these agencies throughout the European Continent, but upon the personnel placed in charge of the same.

Consideration might be given by the Department to the establishment of Commissioners at points where Canada is not at present represented, such as at Antwerp, Marseille and Genoa.

Acknowledgment is also desired to be expressed to the Secretary of the High Commissioner for Canada in London, Mr. W. L. Griffith, and the Hon. Mr. Roy, Canadian Commissioner in Paris, both of whom obtained for the Delegation the credentials necessary to visit the

various ports, and for the many courtesies shown by them.

### CONCLUSIONS.

The best examples of successful development were found at Liverpool, Hamburg and Rotterdam. In each of these ports connecting lines of railway are included in the harbour development, and they offer not only the advantages of good revenue but they encourage trade and industrial success, and by giving speedy transportation to outlying districts, they result in favourable labour conditions.

Perhaps the best example of progressive port development, both constructive and commercially, is found at Hamburg, where in the combined efforts of the government, shipping interests and the public, one is greatly impressed with their magnificent organization and aggressiveness, to which policy is due, no doubt, to a large extent the fact that Hamburg has been able to capture a share of the trans-shipping business, of which London formerly held the monopoly.

The industrial development of Germany is most strikingly illustrated by the growth of her shipping and the expansion of the business done through her own harbours and the harbours of Rotterdam and Antwerp.

This combination is also assisted not only by the indomitable courage, earnestness and perseverance of the people, but by the wonderful Consular system of the German Empire, which ranks foremost in the world, in advising, with despatch and effectiveness, the German manufacturers of the requirements and inventions of all the world countries. This is, of course, part of their excellent governmental system, which follows up

minutely and aggressively every phase of the industrial, commercial and shipping development of the nation.

The conclusions to be drawn, as a result of the careful study of the causes of success of the different ports which were visited, are, in brief: that Montreal possesses all the features that make for the success of a great port and is being developed along proper lines. It possesses unity of control in its management, adequate room for enlargement, and a carefully prepared plan providing for expansion. When it is considered how important the possession of a great seaport is for the economic welfare of a nation, it is imperative that the Harbour of Montreal should be developed so that it may not only care for the pressing needs of the present, but for the great and increasing business of which it is assured in the future.

It may be fairly stated that no port in Europe and hardly any other in America has a more commanding position than Montreal, with respect not only to the trade of the Dominion but of the whole continent. Situated as it is at the interchange point of ocean and inland shipping and at the converging point of the three trans-continental railway systems, Montreal should be able, with proper terminal facilities, to compete on equal terms with any port for the trade of that vast territory which is tributary to the Great Lakes and their connecting waterways.

Commercially, the importance of the trip must not be overlooked as it will be the means of laying the foundation for opening up new avenues of trade between the world ports of Europe and the Port of Montreal, especially in grain, and bring new ships to the St. Lawrence waterway.



Harbour of Montreal in 1872



## INSPECTION OF HARBOUR OF MONTREAL BY H. R. H. THE DUKE OF CONNAUGHT.

A wish having been expressed by the Governor General to inspect the Harbour, the Commissioners on the 23rd April had the great honour of showing His Royal Highness over the works of improvement being carried out in the Harbour, in all of which he manifested much interest.

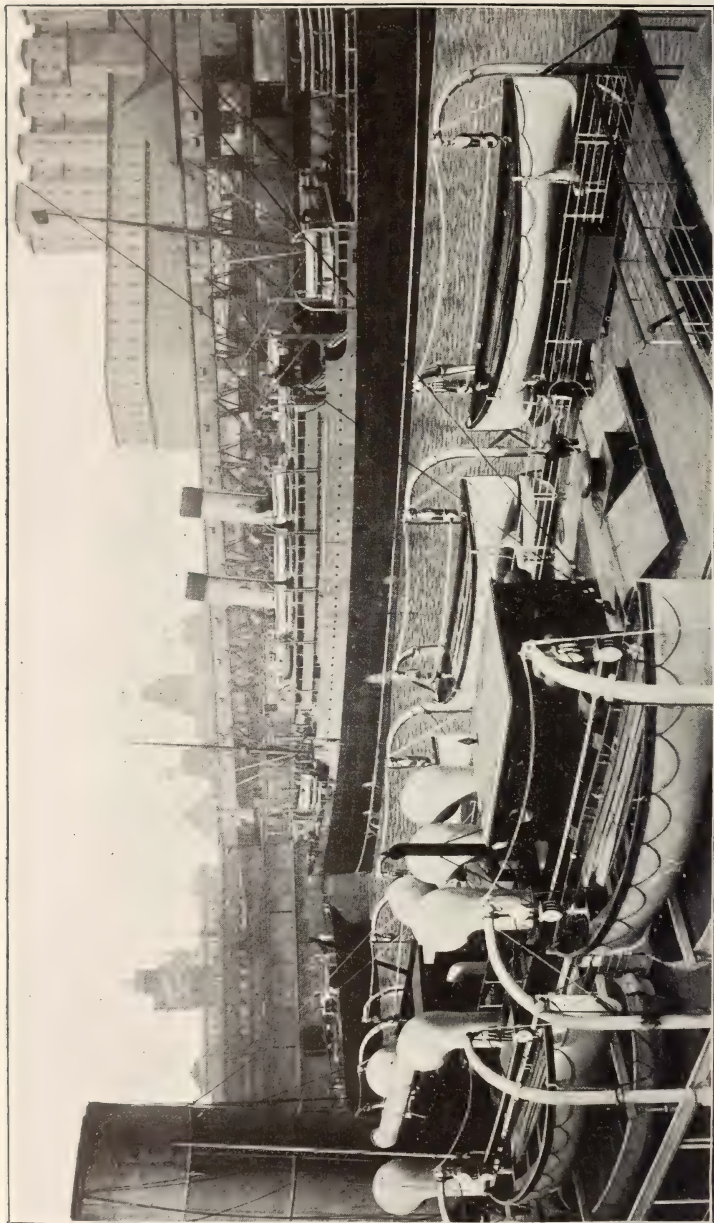
### SHIPPING.

The first vessel to arrive was the S.S. "Corsican," which steamed into the Harbour on the 29th April, the Commander, Capt. Hall, being presented with the customary token.

In spite of the fact that upon the declaration of war many of the regular liners were requisitioned by the



View of the Harbour of Montreal as it appeared in the year 1830



Ship Congestion in Harbour, Sept., 1914

Dominion and Imperial Governments, and several lines automatically ceased their connection with the Port, the season has nevertheless been a banner one, 96 more sea-going vessels arriving than last season and the tonnage in ocean and inland vessels showing an increase of 650,455 tons.

To meet the withdrawing of the regular liners, many of the shipping companies chartered a large number of vessels, and diverted others from American ports to Montreal.

On the 21st August there were as many as 56 sea-going vessels in port, and for weeks after, following the outbreak of war, an average of 40 vessels, caused by the difficulties of exchange and high rates of war risks. The situation, however, soon adjusted itself, through British command of the Sea.

The usual statements are hereto appended, showing:

1. The number and tonnage of all vessels.
2. Classification of transatlantic vessels.
3. Classification of vessels from the Lower St. Lawrence and Maritime Provinces.
4. Number and tonnage of sea-going vessels and their different nationalities, also the number of men that manned the vessels.
5. The opening and closing of navigation, the first arrival and last departure of vessels and the greatest number in port at one time.

Included in the above statements are 224 tramp vessels, the arrival of which in the Port has in a large

measure been responsible for the record established. These vessels were employed as follows :

3	vessels	took	complete	cargoes	of	flour
2	"	"	"	"	"	transports
3	"	"	"	"	"	horses
4	"	"	"	"	"	hay
173	"	"	"	"	"	grain
39	"	"	"	"	"	mixed cargoes

With such an expansion or increase in tonnage as is shown in the following statement of the shipping of the Port, it is hardly necessary to emphasize the necessity of building, with all vigor, additional berthing accommodation to keep pace with the continual increase of shipping demands,—

1895.....	2,013,103	tons.
1900.....	3,000,000	"
1905.....	4,725,607	"
1910.....	6,561,021	"
1914.....	9,044,457	"

Every American port is getting ready to cope with the trade resulting from the natural growth of world commerce, consequent upon the normal increase of population and potentially from the large amount of entirely new business which inevitably will result from the opening of the Panama Canal.

No sentiment is attached to the distribution of trade. If natural and artificial advantages are sufficient, if freight rates are favourable and suitable, if wharfage accommodation can be had, one port is absolutely as good as another in the eyes of the practical steamship



manager. Montreal has the natural advantages, enjoys a very substantial preferential inland water and railroad freight rate over most of her rivals, and only the lack of accommodation will prevent her from reaping a large reward in the growth of her trade.

### **NEW STEAMSHIP SERVICES.**

At the beginning of the season, the Hamburg-American Line leased shed No. 47, Tarte Pier, establishing a fortnightly service between Montreal and Hamburg, which was discontinued upon the outbreak of war.

The Roth Line also inaugurated a fortnightly service between Montreal and Antwerp.

The C. P. R. Liner "Missanabie" and Cunard Liner "Alaunia" entered the St. Lawrence service to Montreal, and the Steamship "Aurania," now being completed by the Cunard Line for the Canadian trade, is expected upon the opening of navigation, 1915.

The Sincennes-McNaughton Co. also added to its fleet four tugs.

### **HARBOR MASTER'S DEPARTMENT.**

On the 8th of June, Capt. L. A. Demers resigned the position of Harbour Master, to accept that of Dominion Wreck Commissioner, and was succeeded by Capt. T. Bourassa, Deputy Harbour Master. Capt. Frank J. Symons, R.N.R., was appointed Deputy Harbour Master.

### **POLICE DEPARTMENT.**

This department, now in its second year, regulates the traffic on the wharves, maintains order, and protects life and property within the limits of the Harbour.

The appointment of a practical Chief of Police was accomplished by the engagement in March of Capt. James Coleman, under whose direction the department has been fully organized and increased.

Twenty constables were sworn in on the 15th April, upon which date was commenced the patrolling of that portion of the Harbour between the entrance of the Lachine Canal and the Sutherland Pier, a distance of  $3\frac{1}{2}$  miles. On the declaration of war, the staff was increased to 36, in addition to which Dominion Police established a force of 40 constables. Working in harmony with the Harbour force, and aided by a large number of the City constables, a system was inaugurated whereby access to the wharves was prohibited except by special pass. Armed constables guarded every entrance, as well as the elevators and ships, every possible precaution being taken to ensure their safety, so as to permit of a continuance of exports to the Motherland.

During the season of navigation, the police attended the arrival and departure of every passenger vessel, and it is a pleasure to be able to state that not a single piece of baggage was reported to have been stolen from passengers, or from the different transfer agents, and not an assault or robbery with violence was reported to have been committed within the Harbour.

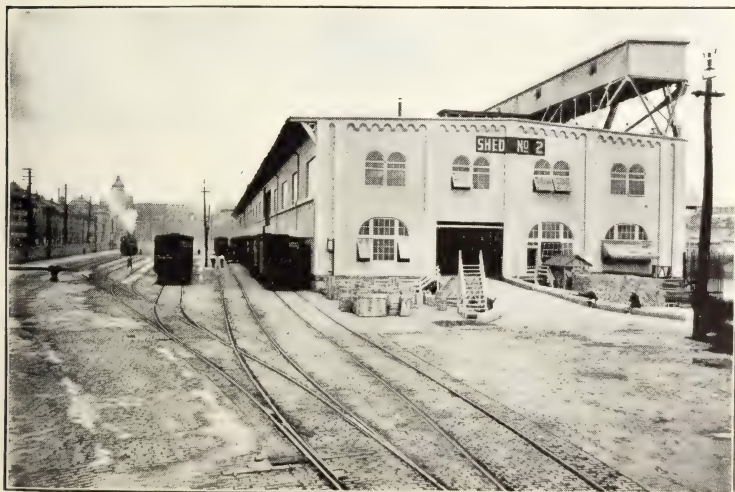
As the primary object of the police is the prevention of crime and protection of life and property, the efforts of the constables have in that direction been very successful, as also in the regulating of traffic at the different entrances, with a view to avoiding accidents, not a single one having occurred on the railway tracks during the season, notwithstanding the free movement of trains at all hours.

In order to provide additional protection to life and minimize drowning accidents, a course of instruction in first aid was given to the officers and constables, all of whom are essentially first class swimmers. One hundred and twenty-four persons were arrested and brought before Magistrates and Recorders for different minor offences during the season.

## RAILWAY TRAFFIC DEPARTMENT.

### *Winter Operation :*

During the winter season of 1913-1914 but one of the high level sheds was used, the C. P. R., as in previous years, occupying shed No. 8, King Edward Pier, as a distributing and sorting station for import freight from the winter ports. Sheds Nos. 10 and 11, used in the previous years by the Canadian Northern and Grand Trunk Railways, respectively, owing to the general trade depression, were unoccupied, and the



Shed No. 2 and General Track Lay-out.

consequent diminution in railway traffic was manifested to a great extent, the winter season showing a decrease of 30 per cent.

### *Car Handling:*

The regular traffic of the season of navigation began in the latter days of April, and the returns of cars handled for the year are most gratifying, the loss in the winter season, noted above, having been made up by the end of the year.

Following the outbreak of war, traffic conditions became deranged, the regular import and export business, in a large measure, giving way to the handling of horses, hay, waggons and other war stores for the British and French Governments.

### *Passenger Traffic:*

In connection with the mobilization of the first Canadian Contingent, more than thirty passenger trains, with officers, men and equipment, arriving in Montreal via the G. T. Ry., were transferred over the Harbour terminals to section 46 and there delivered to the Canadian Northern for furtherance to the Val Cartier Camp. Not the slightest mishap or delay occurred in the operating of these trains, and during this period the suitability of the arrangements in the terminals for handling passenger business direct from cars to steamers, and vice versa, was also fully demonstrated.

### *Coal Transportation:*

A new line of traffic was developed during the summer by this department in the transporting of coal from the coal towers at section 35 to the various industries situated along the Harbour front, having direct rail



connections with the Harbour tracks. Fifteen 50 ton all-steel dump coal cars of the most improved type, made in Canada, were purchased for this service early in the summer, and proved very satisfactory, there having been conveyed no less than 40,000 tons. As an adjunct to this service, the Commissioners had an up-to-date 150 ton railway track scale installed at section 48, over which nearly 2,000 cars were weighed. This scale has also filled a long felt want in providing means of obtaining an accurate check of the carload shipments of materials used in the Harbour works. Many favourable comments were received from the industries served with coal in the said manner, the operation having saved them considerable in cartage and handling.

#### *Locomotive Repairs:*

The general repairs to the locomotives were done at the Engine House during the winter in an efficient manner. The usefulness of these shops is increasing as the scope of the work carried on is being extended. All work on the motive power and rolling stock is now being done within these works at a lesser expense than when given out by contract.

#### *Railway Traffic—New Sheds:*

Before sheds Nos. 24 and 25 were completed they were taken over by the Department of Agriculture for the pressing of hay for the British Government, since which the railway traffic to these sheds has been exceedingly heavy and ample opportunity furnished to prove the advantages of the sheds for railway work. The track lay-out, giving access to the sheds from both ends and on the river side, are excellent features.

During the season it has been shown that all railway traffic, irrespective of its nature, can be operated with despatch and efficiency, which in itself is the precursor of constant development in new lines of traffic, of which but the beginning was made this year.

*Extension of Railway:*

Late in the fall the extension of the railway embankment from the Racine Pier eastwards was begun. As wharves are built between Longue Pointe and Pointe aux Trembles, thus extending the harbour front, the railway must follow, as a necessary integral part of the same. It is hardly necessary to call attention to what the building of the Harbour railway means from a factory or industrial standpoint. An industry located on the line of the Harbour railway not only enjoys the convenience of having direct connection with every avenue of transportation in and out of the city, but is also in an enviable position in so far as freight rate competition is concerned. An industry located on the railway, miles from the city where the land is cheap, is in the same position, as far as the development of its business is concerned, as if it occupied a location on the river front, opposite the heart of the city. The development of the railway makes toward a reduction of the handling and distributing charges in the Port, thus offering advantages to industries to locate along its lines, and assisting them in competing in the markets of the world.

### **HARBOUR BOUNDARY.**

Early in the season Mr. Jos. Rielle, Q.L.S., was instructed to prepare *procès verbaux*, defining and determining the boundary line between the Harbour property and that of the adjoining proprietors of that portion of

the Harbour extending from Longue Pointe Church to Bout de l'Isle, as enacted by 8-9, Edward VII, Chapter 24, 1909. The *procès verbaux* have all been prepared and signed for and on behalf of the Commission.

### CONVENTION AT BALTIMORE.

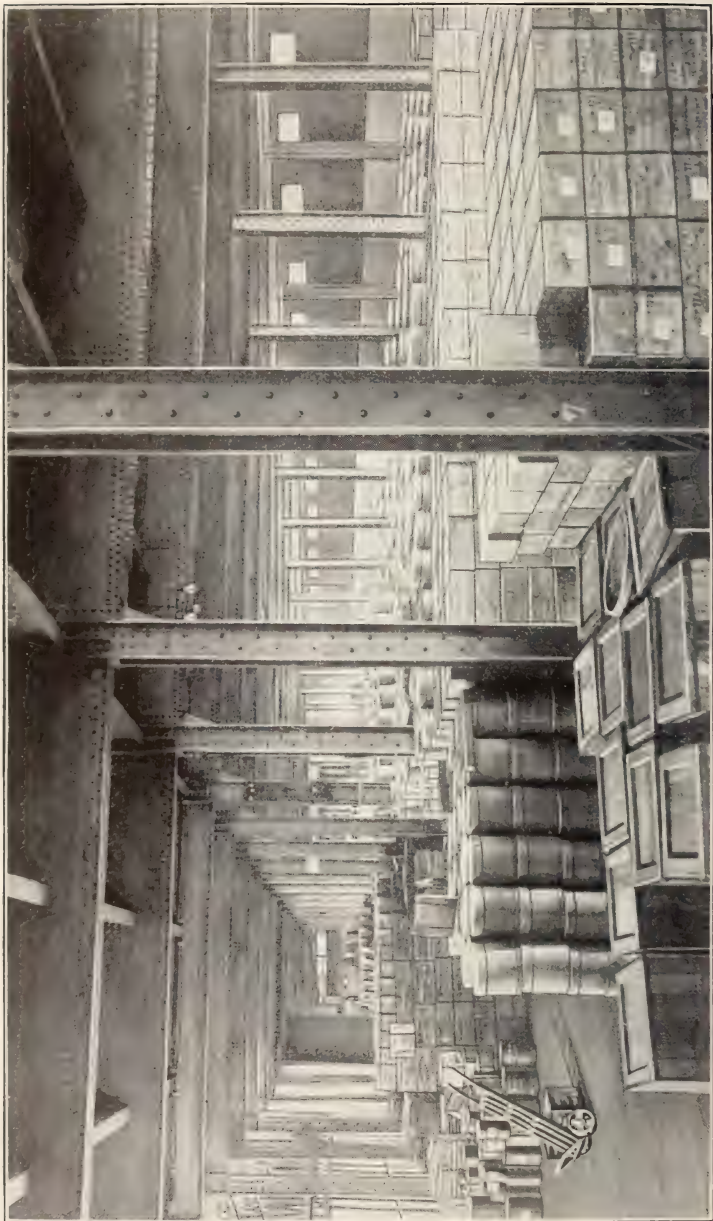
On the 8th, 9th and 10th September, the Secretary, Major David Seath, represented the Commissioners at the Third Annual Convention of the National Association of Port Authorities of the United States, held at Baltimore, Maryland.

As the purpose of this Association is to exchange information relative to port construction, maintenance, operation, organization, administration and management, and to formulate recommendations for the standardization of port facilities, as also for the encouragement of water-borne commerce, much valuable data was gleaned from the 12 papers presented with regard to the systems employed at other ports.

The most important feature of the Convention was the changing of the name of the Association to that of the American Association of Port Authorities, in order to admit membership of those engaged in Harbour work in Canada and Mexico.

### MOFFATT'S ISLAND.

The Commissioners have acquired, by authority of an Order-in-Council, Ile a la Pierre, commonly known as Moffatt's Island, near St. Lambert, from the Grand Trunk Ry. Co. In order to lessen the St. Mary's current, and provide a channel between St. Helen's Island and the South Shore, the removal of part of Moffatt's Island is necessary for the purpose.



Government War Supplies, Shed No. 15, Sept., 1914



## INSPECTION OF ST. JOHN HARBOUR.

In the latter part of December, on the invitation of the Minister of Marine and Fisheries, Commissioners Robertson and Labelle devoted two days to the inspection of the development being carried on in the Harbour of St. John, N.B., the sudden illness of the President preventing him from accompanying his colleagues.

Every courtesy was accorded them to get first-hand knowledge of the existing equipment of the port and to study the plans prepared for its future development, which will provide exceptional facilities to take care of the business which should be diverted to that port during the winter months, when navigation at Montreal ceases. Trade captured by the Port of Montreal during the summer should be handled through St. John or Halifax during the winter, and not be permitted, through lack of enterprise or facilities, to be diverted to American ports.

It is hoped that the visit will result in closer co-operation between the Harbour of St. John and the Harbour of Montreal in an endeavour to secure and retain Canadian trade for Canadian channels.

## WAR CONDITIONS.

Immediately after the outbreak of the war, the Commissioners devoted considerable time and attention to facilitating the forwarding of supplies to the Mother Country and the Allies, as well as the Belgian Relief Gifts. Fortunately, the new sheds Nos. 24 and 25 were approaching completion and were forthwith placed at the disposal of the Government for the pressing and shipping of

hay, which was carried on day and night. A railway yard and special railway tracks were immediately installed to facilitate the quick despatch of the same.

During the season of navigation the hay was pressed and loaded directly into ships alongside the sheds; since the closing of navigation, the hay is taken as it comes from the farmers, pressed and loaded into cars on the



Government War Supplies—Compressed Hay, upper floor, Shed Nos. 24-25

other side of the sheds and shipped directly to the Canadian winter ports. At the present time, hay, compressed from the farmer's bale of 18 cubic feet to the shipping bale of 6 cubic feet, is being shipped to the seat of war, at the rate of 20 or 30 cars daily. The advantageous sale of this hay, the work of compressing, the switching in and the switching out, are all of great benefit to the Montreal community.

The immense gifts of flour from Canada and food-stuffs from the various provinces, horses and other supplies were shipped through the sheds of the various steamship lines, taxing their capacity to the utmost.

These most important features of the season's record resulting from the changes due to the war, commencing at mid-summer, caused no little congestion and anxiety.



Government War Supplies—Part of Canada's Gift

Harbour and trade conditions were suddenly changed. Shipping programmes were wiped out and freight contracts upset. Until the silent but effective command of the seas was assured, business in the Harbour was greatly disturbed. Fortunately, however, the measures taken to restore trade were so speedily effected and so successful that shipping immediately recommenced and, largely owing to the adaptive facilities in the Port of Montreal,



Harbour Elevator No. 1, showing New Addition. Present capacity 2,500,000 bushels.



the required changes to meet new conditions of shipping and business were speedily made.

### **CANADIAN PATRIOTIC FUND.**

A deserving record is desired to be made of the hearty response given by the officials and employees of the Commission, who, by entirely voluntary subscription, contributed the munificent sum of \$2,862.27 to the above fund.

### **CEDING OF MOREAU AND MARLBOROUGH STS.**

In order to provide for the rapid increase in Harbour business, and the addition of further railway facilities, the Commissioners some time ago acquired the property situated between Notre Dame St. and the Harbour boundary, for a distance of about 1,290 feet, fronting on Notre Dame St., starting from Desery St. west.

As it is no longer necessary to provide access to the Harbour by way of Moreau and Marlborough Sts., inasmuch as the purchase of the above property extends the Harbour up to Notre Dame St., by deed of agreement executed on the 9th January, 1914, the City of Montreal ceded to the Harbour Commissioners that portion of Moreau and Marlborough Sts. between Notre Dame St. and the Harbour boundary, the Commissioners undertaking to construct a subway at Aylwin St., and to pave the same to the City line.

The following summary and comparison show what increased facilities have accomplished for the Harbour of Montreal:—

#### TONNAGE OF VESSELS

1895.....	2,013.103
1900.....	3,000.000
1905.....	4,725.607
1910.....	6,561.021
1914.....	9,044.457

#### RECEIPTS ON REVENUE ACCOUNT

1895.....	\$ 275,453.75
1900.....	287,069.18
1905.....	377,492.41
1910.....	836,115.17
1913.....	1,361,964.06
1914.....	1,466,364.27

#### TRAFFIC DEPARTMENT—CARS HANDLED.

1907.....	70,856
1908.....	60,266
1909.....	75,636
1910.....	79,466
1911.....	93,859
1912.....	112,911
1913.....	114,531
1914.....	114,449

#### GRAIN HANDLED AT COMMISSIONERS' ELEVATORS.

1906.....	944,321
1907.....	1,078,289
1908.....	8,661,350
1909.....	11,691,071
1910.....	21,526,727
1911.....	21,007,164
1912.....	25,561,655
1913.....	43,349,291
1914.....	62,318,814

### EXPORTS OF GRAIN, 1914.

It is to be noted in comparing the following figures that at Montreal the season of navigation is seven months, as against twelve months at the other ports.

Montreal.....	75,085,432
New York.....	64,532,190
Baltimore.....	45,000,000
Galveston.....	35,821,506
New Orleans.....	34,624,000
Philadelphia.....	23,294,252
Boston.....	16,555,340
Portland.....	9,500,000
St. John, N.B.....	6,269,000
Newport News.....	2,326,620

### PRINCIPAL EXPORTS OF PRODUCE FROM THE PORT OF MONTREAL

	1913	1914
Wheat.....	33,706,089 bushels	61,484,474 bushels
Oats.....	7,297,570 “	8,536,589 “
Barley.....	5,218,390 “	4,552,273 “
Rye.....	210,804 “	335,030 “
Flaxseed.....	7,832,780 “	177,066 “
Flour.....	2,464,913 sacks	2,762,139 sacks.
Meal.....	86,580 “	36,463 “
Eggs.....		113,339 cases.
Butter.....	1,728 boxes	7,228 boxes.
Cheese.....	1,571,502 “	1,482,958 “
Lard.....	579,739 bbls.	468,483 bbls.
Hams and Bacons.....	9,893 pkgs.	4,180 pkgs.
Meats.....	112,725 lbs.	96,039 lbs.
Apples.....	209,926 bbls.	175,597 bbls.
Hay.....	261,719 bales.	495,966 bales.

## FINANCIAL OPERATIONS.

From the Summarized Statement of Operations, hereto annexed, it will be seen that the total amount received on Revenue Account for the year 1914 was \$1,466,364.77, being an increase of \$104,400.21 over the previous year, the larger portion of which increase is attributable to the operation of Grain Elevators Nos. 1 and 2.

The disbursements on Revenue Account, in 1914, were \$1,459,455.08, of which \$785,642.97 was for interest, being an increase in disbursements of \$133,818.72 over the previous year.

There was received from the Dominion Government on loan \$2,032,000.00 under the Act 1, Edward VII, Chap. 9, and Act 2, Geo. V, Chap. 35, on account of expenditure on Capital Account, and also the sum of \$200,000.00 to retire Debentures, Series "C," held by the public.

The disbursements on Capital Account, in 1914, were \$1,758,368.83. The cost of the principal works of improvement carried out are as follows:—

Harbour Dredging.....	\$229,808.22
Real Estate.....	39,469.10
Wharves, Piers and Basins.....	745,062.04
Plant.....	83,663.42
Shops and Buildings.....	24,573.00
Railways.....	115,236.44
Permanent Sheds .....	345,246.56
Electric Hoists, etc.....	31,878.10
Grain Elevators.....	143,431.95

The Debenture Debt of the Corporation on the 31st December, 1914, was \$23,554,000.00, of which \$1,472,000.00 is to the public, and \$22,082,000.00 to the Dominion



ITEMS	TOTALS	GRAND TOTALS	ITEMS	TOTALS	GRAND TOTALS
RECEIPTS ON REVENUE ACCOUNT					
Collector: of Customs :			Grain Elevators and Conveyor Galleries, Operation and Maintenance.....	\$262,347.10	
Wharfage dues on Imports.....	\$217,642.11		Harbour Sheds, Insurance, Maintenance, etc., .....	26,808.98	
Wharfage dues on Exports.....	134,457.12		Electric Team Hoists, Operation and Repairs.....	3,733.98	
Total Customs Wharfages.....	352,079.23		Electric Transporters, Alterations.....	10,003.13	
Local Wharfages and Additional Charges.....	90,804.87	\$442,884.10	Harbour Repairs, Railway Maintenance and Traffic Department Operation.....	208,674.98	
Grand Total Wharfages.....	244,141.83		Floating Crane, Operation and Maintenance.....	5,485.36	
Grain Elevator No. 1, Elevating, etc., .....	306,394.75		(The above expenditures do not include charges for Interest, Administration, Depreciation, Rental of Tracks, Space, etc.)		
Floating Elevators, Elevating, etc., .....	35,350.32		Reconstruction Jacques Cartier Pier.....	1,850.97	
Grand Total Grain Elevators.....		585,886.90	Electric Lighting of Harbour Wharves.....	11,402.18	
Rental of Harbour Sheds.....		166,303.69	Harbour Surveys and Bortings.....	3,730.17	
Rental of Electric Hoists.....		6,034.50	Maintenance Dredging in Harbour.....	3,971.29	
Trailing Department, Switching Cars, etc., .....		196,002.27	Buoys and Beacons.....	778.37	
Floating Crane Charges.....		5,398.30	Annuity.....	600.00	
Rental of Wharves.....	42,747.87		Administration and Miscellaneous Expenses.....	134,425.60	
Rental of Land.....	6,275.05		Total Operation, Maintenance, etc., .....	\$673,812.11	
Rental of Tracks.....	11,996.40		Interest on Debentures, Overdrafts, etc., .....	783,642.97	
Total Rentals.....		61,019.32	Disbursements on Revenue Account.....		\$1,459,455.08
Sundry Receipts on Revenue Account.....		2,834.99			
Receipts on Revenue Account.....		\$1,466,364.27			
RECEIPTS ON CAPITAL ACCOUNT					
Dominion Government Advances under Act 1, Edward VII, Cap. 9.....	22,500.00		DISBURSEMENTS ON CAPITAL ACCOUNT.		
Act 2, George V, Cap. 36.....	2,209,500.00		Altering lower end of Guard Pier. \$ 3,326.66		
Total Advances by Government in 1914.....		2,232,000.00	Widening Inside Guard Pier.....	75,142.89	
Security deposits received from Contractors.....		23,796.75	Channel South of St. Helen's Island.....	121,488.98	
Grand Total Receipts.....		\$3,722,161.02	Moffat's Island Wharf Removal.....	336.55	
Deduct :			Dredging between Ile Verte and Guard Pier.....	29,513.14	
Overdraft at Bank of Montreal, at 31st December, 1913.....	423,073.28		Harbour Dredging, Total.....	\$229,808.22	
Less : Overdraft at Bank of Montreal, at 31st December, 1914.....	305,771.15		Real Estate Hochelaga and Moffat's Island and Market Basin Wharves.....	39,469.10	
Balance to deduct.....		117,302.13	High Level Wharves, Sections 25 to 30.....	285,763.47	
(The above overdraft is for Capital Expenditure for which advances have been applied for from Dominion Government, but not received in 1914.)		\$3,604,858.89	Improvements, Eastern Section, Floating Dock and Site.....	149,035.99	
Deduct :			Pointe aux Trembles Wharf.....	131,016.93	
Outstanding Accounts at 31st December 1913.....	607,307.40		Paving Wharves and Piers.....	114,905.27	
Less : Outstanding Accounts at 31st December, 1914 :			Windmill Point Embankment, etc., .....	55,029.07	
Dominion Government Interest, due 1st January, 1915, included in 1914 Disbursements for Interest on Debentures (see Contra.).....	\$349,606.25		Water Pipes and Drains.....	5,522.30	
Accounts payable.....	242,629.17		St. Helen's Island Wharf.....	3,623.21	
Balance to deduct.....		15,071.98	Wharves, Piers and Basins, Total.....	745,062.04	
			New Plant, Tugs, Dredges, Scares, etc., .....	83,663.42	
			Harbour Yard and Engine House.....	24,573.00	
			New Harbour Railway Tracks and Sidings.....	115,236.44	
			Permanent Sheds, Sections 16, 24 and 25 and Tarte Pier.....	345,246.56	
			Electric Hoists, Alexandra and Jacques Cartier Piers and in Sheds, Secs. 24 and 25.....	31,878.10	
			Grain Elevator No. 1 Addition, East.....	\$91,289.90	
			Grain Elevator No. 1 Addition, West.....	17,914.31	
			Grain Elevator No. 2 Construction, Part II.....	33,227.71	
			Elevator No. 1, Marine Tower.....	1,000.00	
			Grain Elevators, Total.....	143,431.95	
			Disbursements on Capital Account, total.....	1,758,368.83	
				\$3,217,823.91	
			Debentures Series C., due 5th July, 1914, retired.....	200,000.00	
			Security Deposits returned to Contractors.....	20,954.25	
			Grand Total Disbursements.....	\$3,438,778.16	
			Balance at 31st December, 1914 :		
			Cash on hand.....	\$ 4,008.09	
			Bank of Montreal, Coupon Account.....	100.00	
			Accounts receivable and in suspense.....	242,011.50	
			Materials in stock.....	310,157.04	
			Total Balance at December 31st, 1914.....	556,276.63	
			Less : Balance at December 31st, 1913.....	405,267.88	
				151,008.75	
				\$3,589,786.91	

Certified :  
GEORGE SMART, *Comptroller*.

Verified :  
RIDDELL, STEAD, GRAHAM & HUTCHISON, C.A., *Auditors*.

Certified :  
DAVID SEATH, *Secretary-Treasurer*.



Government. The average rate of interest on these Debentures is 3.344 per cent.

## ENGINEERING DEPARTMENT.

The Engineering Department of the Harbour Commissioners of Montreal is organized so as to have charge of the varied and important branches as follows:—Harbour Construction, Maintenance and Operation.

The construction work is almost universally carried on departmentally. The steady growth of the Harbour and the constant yearly effort to keep pace with the commerce has resulted in the Commissioners having a splendid plant for the peculiar construction required. Dredging plant, tugs, derricks and a shop for repairs, are all kept up to date, and the organization for construction is capable of dredging and placing in the works some two or three million cubic yards of excavated material; of building half a mile of cribwork and concrete quay walls of a height from the foundations to the cope of 60 feet; of building fifty thousand cubic yards of concrete, constructing railways, walls, sheds, culverts and, in fact, almost every phase of port construction.

## CONSTRUCTION PROGRAMME, 1914.

This department has, during the year, carried out the following works:—

The improvement and extension of Harbour railway tracks.

The continuation of construction of new Victoria Pier and Market Basin.

The continuation of construction of bulkhead High Level wharves on the river front, eastwards from Victoria Pier.

General dredging for widening and deepening of basins and berths.

Dredging of channels for the amelioration of St. Mary's Current.

Paving and laying railway tracks on the wharves.

The continuation, almost to completion, of improvements resulting in the Floating Dock Basin and site for ship building and repair yard.

The construction and improvement of Harbour facilities, such as hoists, flood gates, bridges, subways and freight yards.

Additions and improvements to Harbour Commissioners' construction plant.

The construction of an industrial wharf at Pointe-aux-Trembles.

The construction of addition to Grain Elevator No. 1.

The construction of a new subway to the Harbour at Aylwin St.

The construction of two transit sheds, Nos. 24 and 25.

The maintenance of berths and channels, of wharves, sheds, buildings, roadways, water service, cleaning of wharves and general repairs.

The operating of Floating Crane, electric hoists and the construction and maintenance of industrial connections with the Harbour, were all carried on during the season with an even greater measure of success than usual.



The construction season resulted in economical work, the price of materials being lower than the average, and weather conditions were favourable, the low water being advantageous for construction work.

### GRAIN ELEVATOR SYSTEM.

The facilities for the storage and handling of grain in the Port of Montreal are not only one of the most important in connection with the Harbour, but were most successful during the operating season.

In 1907, the Capital Expenditure by the Commissioners, for the storage and handling of grain, amounted to \$1,568,534.76. In that year, the total quantity of grain handled amounted to 1,078,289 bushels. The revenue did not pay the operating expenses and the maintenance and interest charges had to be made up from other sources.



Grain Vessels, Elevator, No. 1 Basin

During the season of 1914, when the Capital Expenditure on the Harbour grain handling facilities amounted to \$5,380,000.00, the total quantity of grain handled to December 31st amounted to 62,318,814 bushels.

With this large tonnage for handling and with the revenue derived from storage of grain, the total returns resulting from the Harbour Commissioners' plant for the storage and handling of grain during the season will be sufficient to pay for not only interest on the buildings and operation, but also for upkeep.

In connection with the Elevator System, the difference between the failure of 1907 and the success in 1914 is one of the most successful lessons to be learned in port design. The elevator in 1907 had been completed for three or four years; it was considered the most up-to-date and efficient elevator possible to build and it was located in the best part of Montreal Harbour. Ocean ships requiring to take grain, however, required to move from their berths to the elevator for their cargoes. This resulted in loss of time, in removing of all gangways and in expenditure for pilotage, towing, etc. As the margin between one method of grain handling and another on a large tonnage of grain is very slight, the grain trade did not appreciate the Harbour Commissioners' Elevator up to that date.

The construction of the large system of transit sheds, with grain conveyors to each berth and the organization of a very efficient operating staff, has, in a few years, effected a great change, and the increase of the Harbour Commissioners' share in handling of the Canadian grain trade in 1914, to an amount sixty times greater than it was seven years ago, is a remarkable record.

The investigations made by the Harbour officials in April, 1914, as to the conditions and cost of grain handling in European ports, as compared with Montreal, resulted in information very favourable to the Canadian port.

In the Port of London it was found that all construction costs, both material and labour, in connection with Elevators are lower than in Montreal. Operating costs, such as wages and supplies, were cheaper in London than in Montreal. The only item cheaper in Montreal than in London was power.

A comparison of the tariffs regarding storage and handling of grain resulted as follows:—

**Harbour Commissioners of Montreal**

Working out (shovelling), elevating, weighing, storage for twenty days, weighing and delivery by conveyors into ocean ships, 8/10c. per bushel.

**Port of London Authority.**

Working out, receiving from ship, weighing at delivery and delivering within 14 days 4s. 4d. per ton, or 2 4/5c. per bushel.

In addition to the very great difference in favour of Montreal, regarding tariff charges, the storage period is longer in Montreal and the advantage in having ocean vessels receive their cargoes at their ordinary berths is much more favourable to Montreal.

## OPERATION OF GRAIN ELEVATOR SYSTEM.

### Storage and handling of Grain, 1906 to 1914

The total quantity of grain handled by the Harbour Commissioners' Elevator System, exclusive of the grain handled at the Grand Trunk and other local elevators, shows what improved facilities have accomplished:—

Year.	Total quantity of grain received or transferred. Bushels.
1906.....	944,321
1907.....	1,078,289
1908.....	8,661,350
1909.....	11,691,071
1910.....	21,526,727
1911.....	21,007,164
1912.....	25,561,655
1913.....	43,349,291
1914.....	62,318,814

This has been handled as follows:—

#### At Grain Elevator No. 1.

Year	Bushels.
1906.....	944,321
1907.....	1,078,289
1908.....	8,661,350
1909.....	11,691,071
1910.....	14,906,569
1911.....	13,849,475
1912.....	16,179,503
1913.....	15,554,282
1914.....	28,477,151

#### At Grain Elevator No. 2.

1912.....	2,346,930
1913.....	20,819,055
1914.....	29,400,308



By Floating Elevators.	Bushels
1910.....	6,620,158
1911.....	7,157,689
1912.....	7,035,217
1913.....	7,459,933
1914.....	4,441,355

The operation of the Elevator System during the season of 1914 may be given as follows:—

**Elevator No. 1.**

Total storage capacity in bushels, 2,500,000.

First vessel unloaded, April 30th, 1914.

Last vessel unloaded, November 21st, 1914.

Total receipts, 28,477,151 bushels.

The above amount of grain was elevated from 96 barges and 398 steamers, a total of 494 vessels.

**Delivery was made as follows:—**

By conveyors, 27,635,810 bushels.

To cars, 94,488 bushels.

To teams, 47,344 bushels.

By bags, 46,637 bushels.

In store at end of season, 899,782 bushels.

**Elevator No. 2.**

Total storage capacity in bushels, 2,600,000.

First vessel unloaded, April 29th, 1914.

Last vessel unloaded, December 7th, 1914.

Total receipts, 29,400,308 bushels.

By water, 21,057,012 bushels, taken from 92 barges and 304 steamers, or 396 vessels.

By cars, 8,343,296 bushels, unloaded from 5,759 cars.

**Delivery was made as follows:—**

By conveyors, 25,184,357 bushels.

To cars, 1,521,934 bushels.

To teams, 1,051,771 bushels.

By bags, 1,498,879 bushels.

In store at end of season, 1,296,523 bushels.

**Floating Grain Elevators.**

Total amount grain transferred, 4,441,355 bushels.

Six floating elevators were operated during the season.

**Grand Total** grain handled in 1914, 62,318,814 bushels.

Total grain handled in 1913, 43,349,291 bushels.

Increase over 1913, 44%.



Ocean Grain Vessels Loading and Waiting for Berths, Windmill Point

Some of the features of note regarding the grain trade in Montreal Harbour, during 1914, were the receipt of a cargo of corn from the Argentine Republic, the shipment of Canadian wheat to New Zealand and the receipt of Canadian grain to the amount of about 1,500,000 bushels, re-shipped from Buffalo Elevators. The corn was unloaded by one of the marine legs at Elevator No. 2, the first time these marine legs were ever used in an ocean ship. The wheat going to New Zealand was bagged before shipping. The grain coming from Buffalo, part of which had wintered in the Buffalo Elevators, was re-shipped and sent for export through the Port of Montreal, and may be taken as a distinct approval of Montreal Harbour facilities.

The Harbour Elevators were seriously congested in May and June and again in November, and at one time about thirty vessels were waiting to unload, containing approximately 1,500,000 bushels.

Although this large amount of grain, amounting to between one million and a half and two million tons, was handled by the Harbour Commissioners' Elevator System, it was not successfully accomplished and delivered on long lengths of conveyor belts, in the complicated manner of grain shipments, without great care on the part of the Elevator staff and a heavy expenditure in wages and operating power.

The regular number of men employed at Elevators Nos. 1 and 2, on the Conveyors and on the Floating Elevators, not including shovellers, was 125. The maximum requirements of electric power for operating the Elevator System amounted to 5,570 H.P.

No serious accidents occurred to the plant during the summer, although the wear and tear of working day and

night for about thirty weeks will require a large amount of overhauling, repairs and renewals during the winter.

At the close of the season, the Elevators contained 2,196,305 bushels of grain, subject to storage or delivery, as required.

**Grand Trunk Railway Elevator.** In addition to the Harbour Commissioners' Elevators, the Grand Trunk Railway Company own and operate Elevator "B" and annex, between Windmill Point and Lachine Canal Basin. This elevator is built upon a site leased to the Company for a period of forty years. The tariff of charges, which are the same as apply at the Harbour Commissioners' Elevators, before becoming effective, require to be approved by the Harbour Commissioners.

The storage capacity of Elevator "B" and annex is 2,150,000 bushels, and there were received during 1914, 20,538,460 bushels.

### FURTHER STORAGE REQUIRED.

After completion of the addition to Elevator No. 1, giving the Harbour Commissioners' Elevators a storage capacity of 5,100,000 bushels, at a total cost, including working and storage elevators, marine tower, jetty and marine towers, conveyor galleries, and conveyor equipment, amounting to \$5,380,000, it was expected that with the Grand Trunk Elevator and its addition, also completed in 1913, the grain trade in the Port of Montreal could be taken care of without undue congestion or serious delays.

In spite, however, of this increase in storage capacity, completed in 1913 to the amount of 45 per cent, the



grain storage capacity in the Port of Montreal was completely filled up fifteen days after the opening of navigation, and although unprecedented shipments were being made, the congestion referred to above amounted to from 15 to 30 lake grain vessels, waiting to unload during two months of the season of 1914.

The Commissioners immediately considered the question of a further addition to the storage capacity of the Montreal elevators. The year was not favourable for expenditure on new works, but the trade was very insistent.

After careful study, it was decided to make a further addition to Elevator No. 1, and the west extension was designed on lines similar to the addition completed a year ago, and to be, in fact, a continuation westwards of the same structure. It was designed as large as the space in this part of the Harbour would permit, and according to the plans will have a capacity, when built, of 1,500,000 bushels, which will give this elevator a total capacity of 4,000,000 bushels.

Owing to the filled ground in connection with all Montreal Harbour improvements, and the high elevation of the wharves at low water, the founding of elevators in Montreal Harbour is an expensive proposition. This is, however, much more than made up for by the excellent situation in connection with the Harbour distributing and conveyor system, and representations were made to the Commissioners that they would be well advised to build all the additional storage room possible at this site.

Plans and specifications of this west extension have been completed and the Commissioners are making

preparations for the early commencement of construction, so as to have this additional elevator capacity in the Port of Montreal ready for operation as early in 1916 as possible.

## **THE IMPROVEMENT AND EXTENSION OF THE HARBOUR RAILWAY TRACKS.**

To make the Port of Montreal the best possible terminal connection between the Transcontinental Railway Systems of Canada and the North Atlantic Steamships, the shore area of the Harbour has been designed as a convenient railway terminal. The railway tracks being operated directly by the Commissioners, such supervision can be made of traffic as to permit of extensive shunting and to give convenient access for railway freight to all points on the wharves at all hours, day or night.

The Grand Trunk and the Intercolonial Railways connect with the Harbour front at its extreme upper or westerly end. The Canadian Pacific and the Canadian Northern Railways reach the Harbour towards the lower or eastern end.

The large Harbour transit sheds, otherwise idle during winter, are very well adapted for the handling and delivery of steamship freight by rail from winter ports.

The railway terminals of the Commissioners which are being developed for ocean railway traffic concurrently with the increased facilities being constructed for shipping, have been considerably extended during the season of 1914.

## VICTORIA PIER AND MARKET BASIN.

In the scheme of Harbour extensions, commenced in 1910, every consideration was given not only to the enlargement of steamship accommodation but also to give additional and convenient accommodation to the important fleet of river and ferry steamers.

It was recognized that the river steamers, which do a tremendous passenger and market traffic, should have a location in the Harbour convenient to the centre of the City and to the Bonsecours Market.

The construction of this large pier in the very centre of the congested Harbour district is one of the most serious matters occupying the attention of the Engineering Department. Every effort is made to advance the work without undue cost and also not to interrupt the immense traffic which is carried on during the seven months of the navigation season.

Up to the close of 1913 the outer part of the old Low Level Victoria Pier was still used, although the new work of construction had almost surrounded it, connection being made to the old part of the wharf by a bridge. At the close of navigation last year the bridge was removed, and on opening of navigation, 1914, the work of the removal of the balance of the old Victoria Pier by dredging was commenced.

The construction programme was continued during the season and 300 feet of high level wall was completed and 1,200 feet completed to low level.

Unusual difficulty was encountered in constructing this work owing to the depth of water and variability of currents.

## PERMANENT TRANSIT SHEDS.

### Sheds Nos. 24 and 25.

On the completion of the bulkhead wharf, below Victoria Pier, from Beaudry St. Tunnel, eastwards, giving a bulkhead width of 250 feet, Sheds Nos. 24 and 25 were designed.

These new sheds are of the Montreal Harbour Standard Steel Frame and Reinforced Concrete Slab Type, with provision for the installation of a grain conveyor system on the river side of the shed.

Shed No. 24 at the head of the inclined ramp is suitable for vessels requiring partial shed accommodation, at the same time giving ample berth space for any size of ship.



Newest Type of Montreal Harbour Transit Shed, just completed, December, 1914



The dimensions of these sheds are as follows:—

Shed No. 24.....	264 ft. x 105 ft.
Shed No. 25.....	484 ft. x 105 ft.
The clear head room throughout is 14 feet.	

The upper floor is designed to carry a superimposed or live load of 600 lbs. per square foot.

Owing to the location of these two sheds, the foundation was designed to withstand any unusual ice shove which might be possible in this locality.

The foundations of the sheds were practically completed in 1913, and the balance of the piers and the shed structures were completed during the season of 1914.

Railway tracks have been laid both in front and at the City side of the sheds, and fireproof offices for Customs, superintendents, clerical staff, etc., have been provided and everything necessary installed to make these sheds the most complete in Montreal Harbour.

Two thousand tons of structural steel were required in building these sheds, and almost as soon as the roof was on, the sheds were taken over by the Imperial Government and have been used day and night since that day.

#### **HIGH LEVEL WHARVES, SECTIONS 24 TO 27.**

Part of the old low level quay wall, extending from the low level Market Basin at Berri St., eastward, was widened and strengthened and rebuilt on a four per cent. grade, from Elevation 107 up to Elevation 119, standard high level. From the top of the grade the quay wall was continued eastward. The portion of this work, of which the concrete quay wall had been constructed to



Showing Steamers "Glenfoyle," "Toiler," "Dollard" and "J. T. Horne" in Floating Ship Dock Duke of Connaught, and SS. "Lingan" in Basin

half level in 1913, was completed. A further extension of cribs was added during the season of 1914 and the concrete quay wall built up to half level. The re-filling behind these walls was carried out to the full height and anchor blocks and tie rods completed.

### DRY DOCK SITE.

The Dry Dock site in the Eastern division of the Montreal Harbour required the construction of about 2,500 feet of standard crib and concrete quay wall, having a total height of about 60 feet. The docking basin, 500 feet long, by 1,000 feet wide, was dredged to a depth of 30 feet at the quay walls and to 50 feet in the portion required for sinking the Floating Dock.

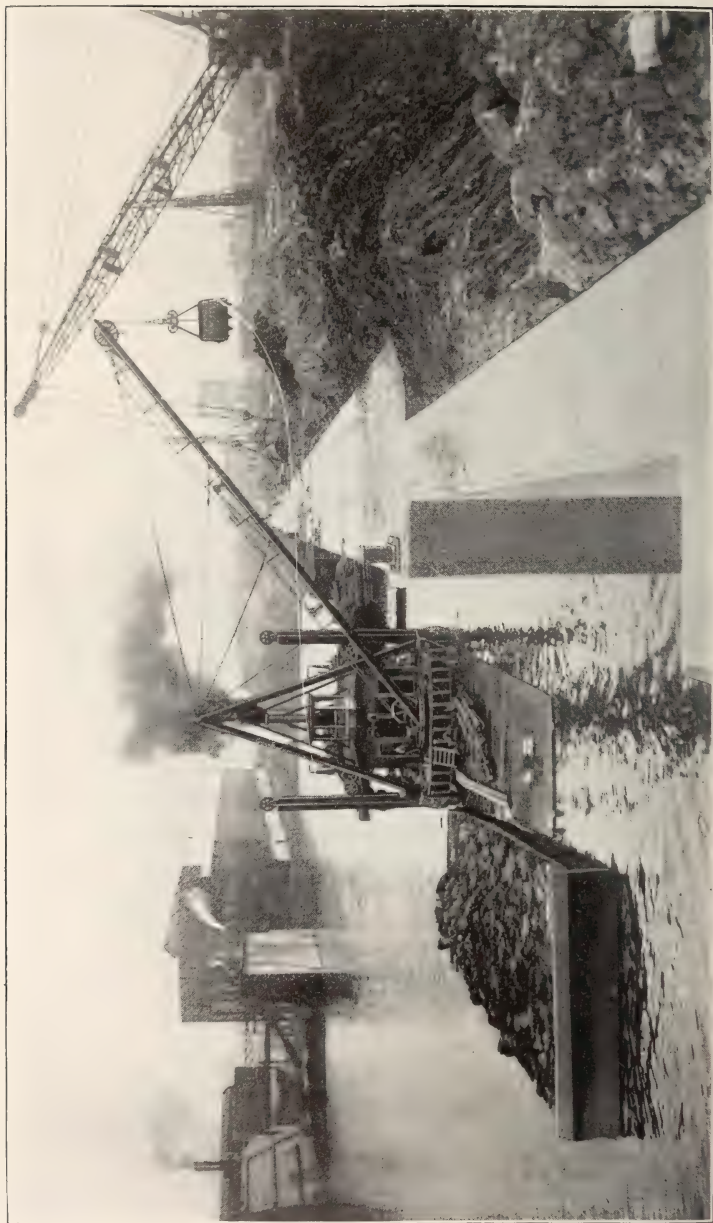
The channel approach required the dredging of an entrance of about 1,000 feet wide.

Thirty acres of filled land were formed for the Shipyard and about six acres in addition for the harbour right-of-way for harbour tracks and roadways.

The total amount of filling required for this work was 1,850,000 cubic yards, measured in situ.

The work was commenced in the summer of 1910, and was practically completed during the season of 1914.

The recent visit of the President and Harbour Officials to Europe included the inspection of many of the large shipyards of the British and Continental Ports. Many of the great shipyards were larger, but the plant, as laid out and constructed by Messrs. Canadian Vickers, Limited, and now nearly completed in full working order, was found to be, though not by any means the largest,



Filling behind Dry Dock Wall, July, 1914



the most up-to-date and convenient in many essential features, viz. :—

1. Location with regard to the Harbour, shelter and easy approach by water.

2. Design and layout of shops, buildings, launching berths, fitting-out berths and docks.

3. Railway communication for materials.

4. No public streets or railways intersecting the yard.

5. Proximity to labour market of Montreal.

6. Availability of cheap electric power.

During the season no less than 22 vessels were docked and repaired at these works, which are owned and operated by "Canadian Vickers, Limited."

### **INDUSTRIAL WHARF, POINTE-AUX-TREMBLES.**

The plant of "The Canada Cement Co.," situated in the parish of Pointe-aux-Trembles, about three-quarters of a mile below Longue Pointe, has been enlarged until it is now the second largest if not the largest and most completely equipped cement plant in the world.

Its capacity is now 12,000 barrels per day. For transportation the plant is now connected by railway only, and all shipments by vessel have to be forwarded by railway lines. The coal consumed in the manufacture of cement is very considerable, and the Company require at this plant an annual supply of 200,000 tons.

A wharf was finally designed to meet the requirements of the Canada Cement Company, and on the Company guaranteeing sufficient revenue, the Commissioners ob-

tained the authority of the Government to construct a wharf for this industry.

The Company owns the land directly to the Harbour boundary line, and they propose to carry all shipments to and from the water front by their own railway lines.

The order for this wharf was given in September, 1913, and although most of the dredging required for the channel approach and 400 feet of the concrete wall to one half level had been finished in 1913, the great portion of the work remained to be done in 1914. Filling was required to the extent of about 250,000 cubic yards, measured in place. The cribwork and concrete quay wall has a length of 600 feet. Most of the grading and leveling has been completed and railway tracks are laid down to the wharf and to the site of the unloading plant and steel towers which the Company proposes to erect.

### **DREDGING AND FILLING IN GENERAL.**

The Harbour Commissioners' plant, consisting of four spoon dredges and one elevator dredge, together with a spoon dredge, formerly owned by the Commissioners, was engaged on the usual work of dredging, consisting of maintenance of harbour berths, dredging to ameliorate the St. Mary's current, dredging for filling, and the usual dredging required for construction work and the crib seats for wharves.

The total amount of dredging done by the Harbour dredges during the year amounted to nearly 1,500,000 cubic yards. Almost all the material excavated was of a hard character, ranging from compact gravel, clay and hard pan to rock. None of the material in Montreal Harbour is capable of being pumped, and the material

when dredged and used for filling requires to be, to a great extent, handled by derricks and locomotive cranes.

One of the most important items of dredging, and which occupied the time of two of the Commissioners' best dredges almost entirely throughout the season, was the construction of a channel 20 feet deep at low water, on the south-eastward side of St. Helen's Island. The extreme slope of the river from the Victoria Bridge down to the lower end of the Guard Pier causes the St. Mary's current, which has been long recognized as one of the features in Montreal Harbour requiring amelioration.

The design of the channel behind St. Helen's Island has for a purpose a discharge of a portion of the river flow through the channel on a fixed slope giving uniform current. The work of 1913 and particularly of 1914 has shown considerable effect, estimated to amount to 15 per cent., in ameliorating the St. Mary's current, even at extreme low water stage of 1914 when it would otherwise have been at its worst.

The two dredges working behind the Island worked under conditions which would appear impossible. These dredges, however, worked continuously throughout the summer in rapids where the water was rushing over the bed of the river and falling into the dredged cut. Only plant of extraordinary stability and dredging officers of great skill could have undertaken this work, which would not have been attempted had not the results to be obtained warranted the effort.

The ground area dredged in 1914 amounted to about  $8\frac{1}{2}$  acres, all of which required the excavation of 20 feet of material consisting of cemented clay and sand with

many embedded boulders. A length of 1,000 feet was dredged for a width of 335 feet, and before the work closed the dredging was in a fair way to approaching deeper water near the head of St. Helen's Island.

Other important items of dredging consisted of dredging between St. Helen's Island and the Guard Pier, consisting almost entirely of large boulders. Four hundred and seventeen large boulders were removed, many requiring to be blasted before dredging.

A channel was commenced on the city side of the Guard Pier up to the Bickerdike Pier, where the material is shale rock. The cut made was 500 feet long, by 120 feet wide, all being dredged to a total depth of 30 feet at low water.

The widening of the main Harbour was proceeded with inside the Guard Pier and an additional width was obtained opposite Jacques Cartier and King Edward Piers.

The entrance channel of the Dry Dock Basin was also widened and deepened and several portions of the ship channel opposite Longueuil and St. Helen's Island were also done by dredges belonging to the Department of Marine and Fisheries.

The drilling and blasting boat was occupied throughout the year, doing excellent work. The number of holes drilled and blasted was 2,769, the average depth of holes being over eight feet and the quantity of dynamite used was 16,074 lbs., of 75 per cent.

The sweeping of the channels and berths was carried out at intervals during the season, and as usual whenever any obstructions were found dredging was carried on as soon as navigation conditions permitted.



The depth of water in the ship channel was unusually low in 1914. The dry weather in the early part of the season and the fact that the level of the lakes was lower than usual, and the absence of east wind, accounted for this extreme condition.

The following table gives the average monthly depth of water in the ship channel in the Harbour during the season of 1914, as compared with the records of 1913, and also the monthly averages of the depth of water on the old No. 1 Lachine Canal Lock Sill:—

Month	Depth on old Lock Sill Lachine Canal				Depth in Harbour Channel	
	Average 1902-1913		Average 1914		Average 1913	Average 1914
May . . . . .	20ft.	6ins.	17ft.	10ins.	35ft. 8ins.	33ft. 3ins.
June . . . . .	19 "	3 "	16 "	4 "	33 " 3 "	31 " 9 "
July . . . . .	17 "	0 "	15 "	5 "	31 " 8 "	30 " 10 "
August . . . . .	15 "	10 "	14 "	5 "	30 " 9½ "	29 " 10 "
September . . .	15 "	3 "	14 "	0 "	30 " 4 "	29 " 5 "
October . . . . .	15 "	3 "	13 "	5 "	30 " 6 "	28 " 10 "
November . . .	15 "	3 "	13 "	4 "	30 " 5 "	28 " 9 "

As an instance, the depth of water in Lake Ontario for October was 0.70 feet lower than in 1913, and 2.22 feet lower than the average for the last 10 years.

### MISCELLANEOUS.

The following important items of construction work and materials used will give an idea of the extent of the Commissioners' operations during the season.

Cribwork built, 2,160 lin. ft.  
 Cribwork sunk, 1,820 lin. ft.  
 Quay walls completed, 2,518 lin. ft.  
 Quay walls completed to half height, 1,159 lin. ft.  
 Retaining and abutment walls completed, 1,228 lin. ft.

New track work, 4 miles.

Paving, 20,000 sq. yds.

Dredging: By Harbour Commissioners' dredges, 1,500,000 cu. yds.

By Marine and Fisheries' dredges, 500,000 cu. yds.

Refilling by derricks, 1,750,000 cu. yds.

Filling obtained from City contractors, 200,000 cu. yds.

Quantities of materials used were:—

Cement, 60,000 barrels.

Sand, 15,000 cu. yds.

Crushed stone, 25,000 tons.

Rubble stone, 20,000 tons.

Displacers, 500 tons.

Gravel, 8,000 tons.

Stone for macadamizing, 2,500 tons.

Timber used to amount of \$215,000.00.

The average number of men employed on maintenance, harbour yard, timber boom, construction work, machine shop, shipyard, dredging fleet, elevators and all other work in connection with Maintenance and Operation, was 1,400.

## CASUALTIES.

The casualties in the Harbour, in spite of the low water season, were very few and reflect great credit on the skill and care of the Montreal pilots.

Only one accident of importance is to be noted, viz:—the grounding of the S.S. "Anglo-Brazilian," opposite Laurier Pier, in August.

The Harbour Commissioners' Floating Concrete Mixer was struck during the night of 6th October, by a steamship and sunk at the Victoria Pier. This vessel was lifted by the Commissioners' plant within 15 days and is now being repaired.

Fires in the Harbour of Montreal were fortunately very few and unimportant during the season of 1914.

## SEASON OF NAVIGATION.

The 1913 season of navigation in the Harbour closed on January 1st, 1914, when a trip was made down the river in the Harbour Commissioners' tug, "Sir Hugh Allan." Navigation opened in 1914, on April 20th. The last steamship left for sea on December 4th, and on December 15th navigation closed, and the Commissioners' dredges went into winter quarters.

## ELECTRICAL BRANCH.

The following is information respecting the installation and operation of the Electric Power and Lighting on the Harbour.

### Power.

The amount of power that has been supplied through the Sub-Stations during the year 1914 is below:—

#### No. 1 Sub-Station. Feeding No. 1 Elevator and Conveyor Galleries.

	Watts.	H.P. Hrs.	Cost.
1914.....	1,317,400,000	1,765,947	\$11,779.22
		Fixed rate.....	6,945.00
		Total....	\$18,724.22

#### No. 2 Sub-Station. Feeding No 2 Elevator, Shed 16 and Victoria Pier.

	Watts.	H.P. Hrs.	Cost.
1914.....	1,000,600,000	1,341,284	\$11,109.41
		Fixed rate.....	9,765.00
		Total.....	\$20,874.41

#### No. 3 Sub-Station. Feeding Engine Shops and Harbour Yard.

	Watts.	H.P.Hrs.	Cost.
1914.....	30,000,000	40,211	\$ 354.94
		Fixed rate.....	256.44
		Total.....	\$ 611.38

No. 1 Sub-Station was remodelled during construction of the addition to No. 1 Elevator and was in service, day and night, throughout the season. The machinery and electrical equipment have proved reliable, and in every case have operated the Elevator and addition without any delays.

A small Sub-Station was installed at Sheds 24 and 25, to carry 300-400 H.P., required for the compressing of hay for war supplies. This station was put into service at short notice, owing to the urgent demand for hay, and will continue in operation for the duration of the war.

## FREIGHT HOISTS IN CONNECTION WITH TRANSIT SHEDS.

### No. 1. Single Team Hoist. Sheds 11 and 12.

Year	Total teams carried	No. days in operation	Electric Power H.P. Hrs.	Commenced operation	Shut down
1911.....	11,997	205	43,162	April 20th	Dec. 9th
1912.....	11,956	193	33,712	May 3rd	Dec. 14th
1913.....	11,486	196	31,098	April 29th	Dec. 15th
1914.....	7,597	197	24,999	April 27th	Dec. 5th

### No. 2. Single Team Hoist. King Edward Pier.

1911.....	4,705	84	27,497	Sept. 7th	Dec. 12th
1912.....	12,935	198	55,430	May 3rd	Dec. 21st
1913.....	11,274	192	45,575	April 28th	Dec. 10th
1914.....	13,549	199	55,979	March 16th	Dec. 3rd

### No. 3. Double Team Hoist. Alexandra Pier.

1914.....	17,269	193	14,806	May 1st	Dec. 12th
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### No. 4. Double Team Hoist. Jacques Cartier Pier.

This hoist is similar to the one on Alexandra Pier and was installed during October and November, being tested on Dec. 2nd, 1914.

### No. 5. Double Team Hoist. Sheds 24 and 25.

This hoist is under construction and will be ready for service for the season of 1915. It is of a similar capacity to No. 3 and No. 4 Hoists and of the same construction.



## **HARBOUR LIGHTING.**

During the navigation season, the Montreal Light, Heat & Power Co. operated, under contract, 176 Series Arc Lamps.

The lighting of the Victoria Pier Extension with 40 lamps is being operated by the Commissioners. Five new type lamp standards were erected in 1914. These standards are entirely of Harbour Commissioners' design and construction and are of superior material, strength and appearance. Provision has been made for the installation of the remaining lamps upon the completion of the High Level Piers, the standards being completed and ready for erection.

At No. 1 Elevator six arc lamps were installed outside on brackets at various points, illuminating the railway tracks and wharf satisfactorily throughout the season.

In general, the electric equipment of the Head Office, Dredging Plant, transit sheds and construction work, was maintained and improved during the season by the regular Electrical Staff.

## **MACHINE SHOP AND SHIPYARD.**

The Machine Shop and Shipyard, situated on the Mackay Pier, are fitted up specially for the construction and maintenance of the dredging and construction plant.

The shop is an old wooden structure, but well equipped with excellent tools and machinery. There is

also an excellent smith shop and boiler shop, both equipped for building and repairing.

The shipyard is very conveniently located for the hauling out as well as the construction and repairing of vessels.

Since 1910, the entire machinery of two dredges has been built, as well as the hull and machinery of two floating derricks, two tugs and eleven large flat scows.

### NEW CONSTRUCTION PLANT.

Three new flat scows of the standard type, dimensions 100 feet long, 30 feet beam, nine feet depth, were commenced March 2nd, and were launched during May and June. These scows were numbered 51, 52 and 53.

A new derrick, hull dimensions 88 feet by 31 feet by 9 feet, was started May 23rd and launched October 19th, to be completed for the opening of navigation, 1915. The machinery of this derrick, under construction at the shop, will embody, in addition to the improvements made on derrick No. 7, the following:—

The steel boom will be of stronger construction and more rigid, the bottom connection of the steel A frame will be of pin type instead of rigid. A further improvement will be made in the turntable pivot casting to prevent rocking. An entirely new type of friction for the hoist and trip drum has been designed and the foundations of the spud operating machinery will be stronger.

A new tug hull was laid down on the shipways, May 26th, and launched November 21st; dimensions 77 feet by 18 feet by 10 feet, being nearly all of oak. The engines being constructed are of compound type, 13 inches

and 26 inches by 22 inches, jet condensing. The boiler is of Scotch Marine type, 10 feet diameter by 10 feet one inch long over all, having two furnaces 38 inches, I.D., and to carry a working pressure of 150 lbs.

The usual maintenance and repairs to the Commissioners' fleet were well and economically carried out during the year.

### DREDGING PLANT.

The following is a list of the Harbour Commissioners' Dredging Plant:—

Name of Vessel.	Lgth ft. in.	Bdth ft. in.	Depth ft. in.	When Built.	Remarks.
<b>Dredges:—</b>					
John Kennedy.....	90	0 36	0 10	3 1892	Wooden hull.
No. 4.....	90	0 36	0 10	9 1900	Steel hull.
No. 5.....	104	0 36	0 10	9 1910	do
No. 6.....	104	0 39	0 10	9 1912	do
Premier.....	86	0 31	5 9	2 1905	Wooden hull.

### Derricks:—

Clam shell No. 1..	76	0 27	6 8	0 1899	Wooden hull.
No. 2..	80	0 30	0 7	0 Sec'd	do
No. 3..	76	0 27	6 8	0 1900	do
No. 4..	75	0 26	10 7	6 1892	do
No. 5..	75	0 26	10 7	6 1892	do
No. 6..	75	0 26	10 7	6 1892	do
No. 7..	88	0 31	0 9	0 1913	do

### Drilling and Blasting

Boat No. 1.....	80	0 27	0 5	6 1895	3 5-in. steam drills.
Boat No. 2.....	60	0 20	0 5	0 1909	2 5-in. steam drills.

Tugs:—

St. Peter.....	74	8	16	1	8	6	1875	Wooden hull. Re-built '03.
Courier.....	36	9	9	3	6	2	1900	Composite hull.
Aberdeen.....	79	3	18	3	9	0	1895	Steel hull.
Robert Mackay...	81	9	17	6	10	0	1899	do
Alph. Racine.....	90	0	18	6	12	1	1905	do
No. 1.....	90	0	26	0	6	0	1893	Iron, Formerly Fl. Elev. No. 1.
Sir Hugh Allan...	130	0	26		15	0	1911	Steel hull, twin scr.
John Young.....	91	8	22	0	9	0	1911	do do
Beaver.....	64	3	15	3	7	3	1892	Wooden hull.
Passe-Partout....	49	1	11	3	5	7	1912	do
Testing boat.....	73	3	14	0	3	1	1897	2 wooden scows, braced 16 feet apart.

3 flat scows..... 67½ yards capacity  
 18 do .....150 yards capacity.  
 11 do .....300 yards capacity.  
 3 dump scows....200 yards capacity.  
 1 do .....100 yards capacity.  
 1 coal scow.....400 tons capacity  
 1 floating air plant.  
 1 floating pile driver

## HARBOUR COMMISSIONERS' YARD.

During the year the staff employed in the shops and stores, averaging 30 men, was constantly engaged in handling the tools and equipment and in keeping all the shore plant in repair.

## WHARF REPAIRS AND MAINTENANCE.

The maintenance of the Harbour wharves, railways, roadways, buildings and equipment is now becoming a very important item. Repairs are required everywhere, and the cleaning of the wharves and roadways is a work

of considerable extent. The maintenance organization constantly employs a staff of repairers, pavers, ironwork men, painters, sweepers and carpenters.

During the season, the wharves were kept in excellent condition and the watering of the extensive areas of roadways gave general satisfaction.

### **LIFE-SAVING EQUIPMENT.**

Every effort is made to maintain a complete life-saving equipment all along the wharves, consisting of life-buoys, ropes and long gaffs, and railings have been constructed at important corners of the wharves and lights have been maintained at places which have proved liable to accident.

### **SHED REPAIRS AND MAINTENANCE.**

The maintenance and repairs to the Harbour Commissioners' extensive system of elevators and transit sheds were carried out during the season. Shed No. 2 and the conveyor gallery on Shed No. 3 were painted, as well as the interior steelwork of both floors of Sheds 3, 5 and 11.

### **FLOATING CRANE.**

The Harbour Commissioners' Floating Crane was operated throughout the season as follows:—

Number of days working.....	131
Number of hours working.....	1,020½
Percentage of time in actual operation.....	77%



## TOTAL NUMBER OF LIFTS:

Commercial.....	373
Commissioners' service.....	104

## AVERAGE WEIGHT OF LIFTS:

Commercial.....	8	134-2240 tons
Commissioners' service.....	18	29-2240 tons

## GREATEST LIFT:

Commercial.....	60 tons
Commissioners' service.....	70 tons

## GREATEST TONNAGE FROM SINGLE SHIP:

Ex S.S. "Pretorian".....	303	472-2240 tons
Total weight lifted during season .....	5,020	1477-2240 tons
Total weight lifted during 1913 .....	6,771	1098-2240 tons

**SAWMILL AND TIMBER BOOM.**

The sawmill was in operation 273 days.

The quantity sawn during the season was 4,401,748 feet of hard and soft wood at an average cost of \$2.95 per M feet, B.M.

The number of men operating the sawmill and planing mill was 16.

The timber used during the year was as follows:—

593,072 lineal feet.
1,952,119 feet, B.M.
7,875 railway ties.
267 cords of slabs.
6 loads of slabs, hard-wood.
7 boat sides.

**ALYWIN ST. SUBWAY.**

A new subway, the construction of which was urged by the City Authorities, was built at Aylwin Street, under the existing railway yards of the Harbour Commissioners, and the yard was relaid to suit the new conditions.

The subway has a minimum head room clearance of 13 feet, with a teamway 30 feet wide and a five foot foot-path, the whole spanned with a seven track plate girder and steel trough floor system bridge, the tracks being laid 13 feet centres and the steelwork designed in accordance with the Canadian Government specification for railway bridges and viaducts, type heavy.

The concrete abutment walls and the paving of the subway were done by the Harbour Commissioners' Departmental Organization, while the steel superstructure, of a total weight of 234 tons, was let by contract and erected by the Dominion Bridge Co., Ltd.

### **FOOT BRIDGE, ELEVATOR No. 2.**

A 50 foot span foot bridge was erected between the wharf at Grain Elevator No. 2 and the Marine Tower Jetty for the use of the Elevator staff and the crews of the ships which are moored at the Marine Tower Jetty.

### **PROPOSED WAREHOUSE AT MARKET BASIN.**

Preliminary studies were made on a warehouse which is proposed to be erected on the high level at Beaudry Street, the construction of which is under consideration by the Commissioners.

The building is designed to be about 400 feet long and 100 feet wide, to have six storage floors, of which five can be used the year round, and one, four feet above the Low Level wharf, will be available only the summer months when the river level is normal.

All floors will be designed to carry a live load of 300 lbs. per square foot of floor, and the six floors will be connected with four high-speed electric cargo elevators.

Warehouses, in connection with the docks, is a feature of European ports. During the past years, American ports have adopted this system as an adjunct to their handling of import and export trade, with success. Many western houses have stated that they would carry larger stocks in Canada if there existed a warehouse on the wharf, economically situated for receipt, storage and re-shipment. The Harbour Commissioners have been obliged to limit the time goods may remain in the transit sheds, and a convenient warehouse is therefore most necessary and would figure out well as a convenience to the public and as a paying concern.

The warehouse is designed to be entirely fire-proof, and provision will be made so that a portion of the building can be converted into a cold storage house if needed.

## GENERAL.

### Labour.

The following table shows the maximum and average number of workmen employed directly by the Harbour Commissioners during the season 1914:—

	Maximum.	Average.
Maintenance, cleaning, removing ice, etc. . .	134	87
Harbour Yard, carpenters, blacksmiths, etc.	32	30
Sawmill and timber boom, sawyers and handymen. . . . .	34	30
Construction of wharves, elevators, etc. . . .	816	517
Machine Shop, machinists, blacksmiths. . . .	162	97
Shipyard, carpenters, labourers, etc. . . . .	111	104
Dredging Fleet, crews dredges, tugs, etc. . . .	300	300
Operation: Elevator No. 1. . . . .	35	35
Elevator No. 2. . . . .	49	49
Conveyors. . . . .	40	40
Floating Elevators. . . . .	19	19
Traffic Department. . . . .	70	70
	<hr/> 1,802	<hr/> 1,378

**Wharf Accommodation.**

The extent of the wharves at the end of the season is as follows:—

For 30 ft draught at O.L.W., and over. 22,855 lin. ft. or 4.328 miles

For 25 to 27½ ft. . . . . 13,192 lin. ft. or 2.498 do

Total deep draught. . . . . 36,047 lin. ft. or 6,826 miles

For 20 ft. draught and under. . . . . 3,005 lin. ft. or 0.569 miles

Total wharfage end of 1914. 39,052 lin. ft. or 7.395 miles

**Extent of Harbour Railway Tracks.**

The extent of the Harbour Commissioners' railway tracks at the end of 1914 is as follows:—

1. South of Lachine Canal, Bickerdike Pier, Windmill Point Wharf and West. . . . . 26,189 lin. ft. or 4.960 miles

Montreal & Southern Counties

Rly. . . . . 425 lin. ft. or 0.080 do

Total South of Canal. . . . . 26,614 lin. ft. or 5.040 miles

2. Sections 12 to 46, High Level,  
Main Line Track. . . . . 50,165 lin. ft. or 9.500 miles

To piers, elevators, cross-overs and  
sidings, etc. . . . . 73,469 lin. ft. or 13.915 do

Sections 35 to 46, Low Level, Main

Line track. . . . . 12,150 lin. ft. or 2.303 do

Sections 46 to 62, High Level, Main

Line tracks . . . . . 13,355 lin. ft. or 2.529 do

3. To wharves, industries, etc. . . . . 22,143 lin. ft. or 4.193 do

4. To Guard Pier. . . . . 10,400 lin. ft. or 1.969 do

5. South Shore, St. Lambert. . . . . 2,300 lin. ft. or 0.4356 do

Grand total tracks on Harbour in use

in 1914. . . . . 210,596 lin. ft. or 39.884 miles

**DEPARTMENTAL STAFFS.**

In terminating this report, the Commissioners desire to express their appreciation of the loyal services rendered by the Staffs of the different departments during the past year.

W. G. ROSS, President.

FARQUHAR ROBERTSON,

A. E. LABELLE,

Harbour Commissioners.



## PORT OF MONTREAL.

Combined Statement showing the Number and Tonnage of all Vessels that arrived in Port during the past Ten Years

Year	TRANSATLANTIC		MARITIME PROVINCES		INLAND		GRAND TOTAL	
	Vessels	Tonnage	Vessels	Tonnage	Vessels	Tonnage	Vessels	Tonnage
1905	442	1,354,829	391	585,227	11,113	2,788,551	11,945	4,725,607
1906	439	1,380,835	381	592,388	12,557	3,095,174	13,377	5,068,395
1907	381	1,339,014	361	586,972	14,420	3,620,050	15,161	5,546,936
1908	364	1,315,688	375	642,916	12,434	3,589,124	13,173	5,548,028
1909	371	1,436,963	299	474,450	10,991	3,146,494	11,661	5,057,907
1910	411	1,658,414	336	574,808	13,636	4,327,799	14,383	6,561,021
1911	401	1,695,613	361	642,639	11,670	4,275,019	12,452	6,613,271
1912	409	1,775,487	327	628,437	12,586	4,649,767	13,322	7,053,691
1913	477	2,020,333	343	670,202	13,426	5,703,467	14,246	8,394,002
1914	551	2,039,133	365	716,385	12,225	6,288,939	13,141	9,044,457

# PORT OF MONTREAL.

Statement showing the Classification of Transatlantic Vessels that arrived in Port during the past Ten Years.

Year	Steamships		Barques		Ships and Brigs		Schooners		Grand Total	
	No.	Tonnage	No.	Tonnage	No.	Tonnage	No.	Tonnage	Vessels	Tonnage
1905.....	422	1,357,517	3	2,324	..	.....	17	14,988	442	1,134,829
1906.....	420	1,372,879	3	1,872	..	.....	16	6,084	439	1,380,833
1907.....	381	1,339,014	..	.....	..	.....	..	.....	381	1,339,914
1908.....	334	1,315,688	..	.....	..	.....	..	.....	364	1,315,688
1909.....	371	1,436,963	..	.....	..	.....	..	.....	371	1,436,963
1910.....	410	1,656,794	..	.....	1	1,620	..	.....	411	1,638,414
1911.....	401	1,695,613	..	.....	..	.....	..	.....	401	1,695,613
1912.....	409	1,775,487	..	.....	..	.....	..	.....	409	1,775,487
1913.....	477	2,020,333	..	.....	..	.....	..	.....	477	2,020,333
1914.....	551	2,039,133	..	.....	..	.....	..	.....	551	2,039,133

## PORT OF MONTREAL.

Statement showing the Classification of Vessels that arrived in Port, for the last Ten Years, from the Lower St. Lawrence and Maritime Provinces.

Year	Steamships		Schooners		Grand Total	
	No.	Tonnage	No.	Tonnage	No.	Tonnage
1905	364	580,485	26	4,116	391	585,127
1906	367	588,980	14	3,408	381	592,388
1907	343	579,930	18	7,042	361	586,972
1908	350	640,244	25	2,672	375	642,916
1909	273	470,936	26	3,514	299	474,450
1910	306	572,022	30	2,786	336	574,808
1911	330	639,752	31	2,887	361	642,639
1912	292	625,099	35	3,338	327	628,457
1913	299	666,053	44	4,149	343	670,202
1914	321	712,327	44	4,058	365	716,385

## PORT OF MONTREAL.

STATEMENT showing the Nationalities and Tonnage of Sea-going Vessels that arrived in Port during the season of 1914, that were navigated by 62,714 seamen.

Nationality	Number of Vessels	Tonnage
British . . . . .	769	2,364,508
Norwegian . . . . .	113	289,441
German . . . . .	11	38,783
Belgian . . . . .	3	18,993
French . . . . .	4	15,071
Austrian . . . . .	4	10,950
Danish . . . . .	7	9,992
Greek . . . . .	1	3,049
Dutch . . . . .	1	1,937
Swedish . . . . .	1	1,518
American . . . . .	2	1,276
Total . . . . .	916	2,755,518

Of the above, 872 were of iron or steel with tonnage of 2,751,460 tons, and 44 were built of wood with a tonnage of 4,058 tons.

## PORT OF MONTREAL.

Statement showing the dates of the Opening and Closing of Navigation, the First Arrival and the Last Departure for sea ; also the Greatest Number of Vessels in Port at one time, during the past Ten Years.

Years	Greatest Number of Vessels in Port at one time						
	Opening of Navigation	Closing of Navigation	First Arrival from Sea	Last Departure for Sea	Sea-going		Inland
					No.	Date	
1905	April 19th	Dec. 12th	May 2nd	Nov. 30th	27	Oct 4th	June 19th
1906	" 20th	" 2nd	April 28th	Dec. 2nd	26	May 28th	July 8th
1907	" 23rd	" 15th	May 2nd	Nov. 29th	29	" 24th	" 8th
1908	" 22nd	" 10th	April 30th	" 26th	24	June 21st	June 30th
1909	" 16th	" 27th	" 23rd	" 28th	22	Nov. 9th	Aug. 31st
1910	" 1st	" 7th	" 11th	Dec. 1st	25	May 18th	Sept. 18th
1911	" 23rd	" 29th	" 26th	" 3rd	24	Aug. 18th	June 5th
1912	" 23rd	" 21st	" 30th	" 3rd	22	July 31st	Aug. 21st
1913	" 9th	" 27th	" 19th	Nov. 29th	29	Oct. 3rd	July 25th
1914	" 22nd	" 15th	" 29th	Dec. 4th	56	Aug. 21st	Aug. 17th



# HARBOUR DREDGING.

1914

Places where Dredges worked	Vessels	Time of Service		Quantity Dredged	
		Days	Total	Cu. Yds.	Total Yds
Altering Guard Pier. ....	Dredge J. Kennedy. ....	1	1		
Inside Guard Pier. ....	Dredge No. 5. ....	33		38,050	
	Dredge No. 6. ....	180 <sup>3</sup> / <sub>4</sub>		173,270	
	Dredge Algonquin. ....	113	326 <sup>3</sup> / <sub>4</sub>	92,400	303,720
Channel South of St. Helen's Island. ....	Dredge J. Kennedy. ....	324 <sup>1</sup> / <sub>2</sub>		144,100	
	Dredge No. 4. ....	348 <sup>3</sup> / <sub>4</sub>		267,750	
	Dredge No. 5. ....	10	683 <sup>1</sup> / <sub>4</sub>	12,600	424,450
Removal Victoria Pier. ....	Dredge No. 5. ....	66		115,150	
	Dredge No. 6. ....	39	105	64,350	179,500
Pointe-aux-Trembles. ....	Dredge No. 5. ....	246 <sup>1</sup> / <sub>4</sub>	246 <sup>1</sup> / <sub>4</sub>	427,950	427,950

Dredging for Crib Seats.			
Market Basin.....	Dredge No. 6.....	16	12,150
Victoria Pier.....	Dredge No. 6.....	38 <sup>1</sup> / <sub>2</sub>	39,350
Section 26.....	Dredge No. 6.....	20	6,400
		74 <sup>1</sup> / <sub>2</sub>	57,900
General Dredging to obtain filling and to clean shoal...	Dredge Premier.....	166	12,180
			12,180
Maintenance.....	Dredge No. 4.....	5	2,700
	Dredge No. 6.....	28	18,917
	Dredge Algonquin.....	2	600
		35	22,217
Miscellaneous Construction work and Wrecking.....	Dredge No. 4.....	8 <sup>1</sup> / <sub>2</sub>	
	Dredge No. 5.....	12 <sup>3</sup> / <sub>4</sub>	
	Dredge No. 6.....	26 <sup>1</sup> / <sub>4</sub>	
		47 <sup>1</sup> / <sub>2</sub>	
GRAND TOTAL.....		1,685 <sup>1</sup> / <sub>4</sub>	1,427,917

# HARBOUR DREDGING.

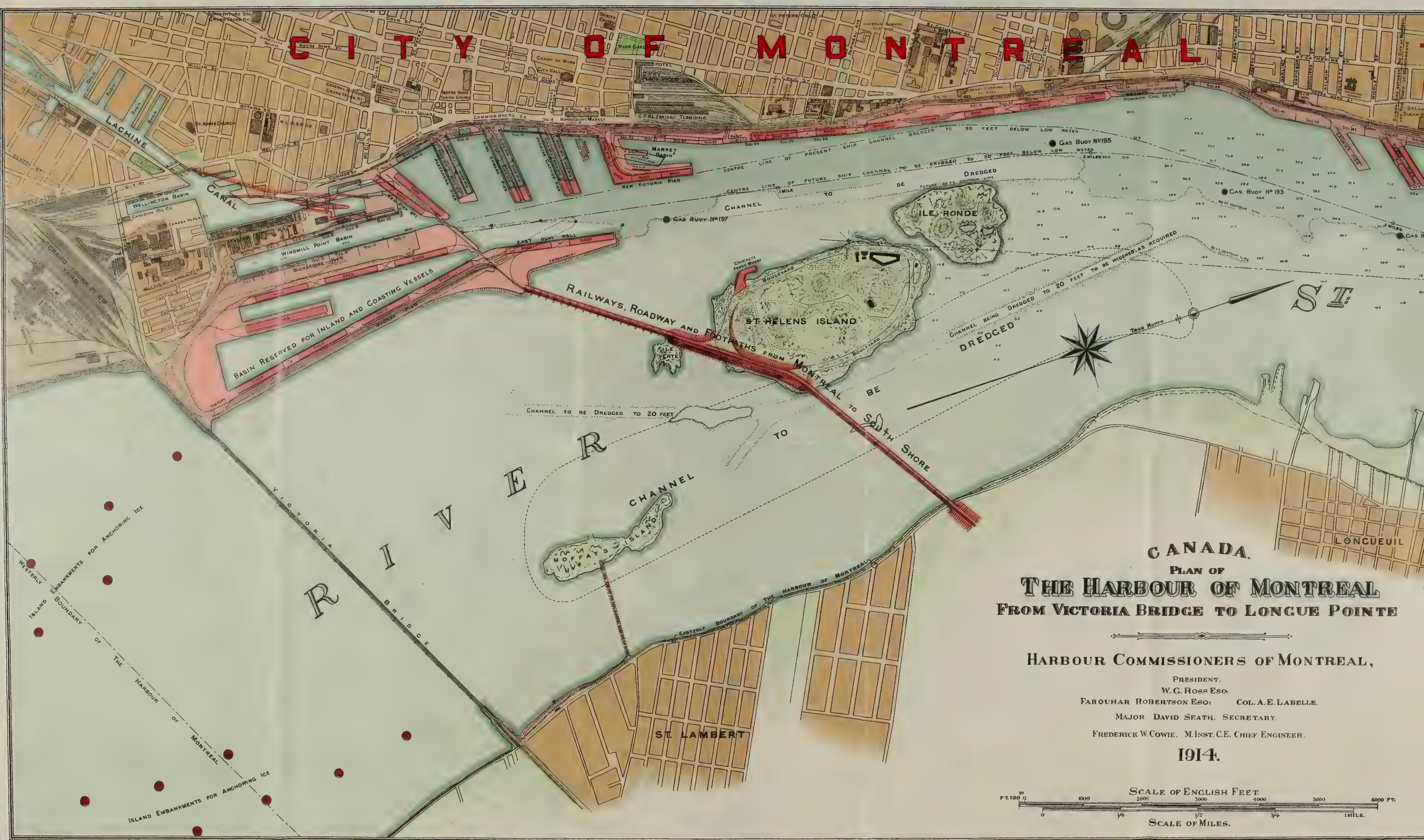
1914.

120

Name of Dredge.	Places at which dredging was done	Time of Service		Quantities dredged		Character of Material dredged.
		Days	Total	Cu. yards	Total yds.	
Dredge John Kennedy....	Altering Guard Pier..... Channel South St. Helen's Island.	1 324½	325½	144,100	144,100	Compacted disintegrated shale and hard pan and boulders.
Dredge No. 4.....	Alongside Windmill Point Wharf and Alexandra Pier (Mainten.) Channel South St. Helen's Island. Miscellaneous construction and wrecking work.....	5 348¾ 8½	362¼	2,700 267,750	270,450	Hard pan and boulder
Dredge No. 5.....	Removal of Victoria Pier..... Pointe aux Trembles..... Inside Guard Pier..... South Channel..... Miscellaneous construction and wrecking work.....	66 246¼ 33 10 12¾	368	115,150 427,950 38,050 12,600	593,750	Timber, stone and earth filling. Rock and clay. Blasted rock and hard pan.

Dredge No. 6.....	Removal of Victoria Pier.....	39	64,350	Timber, stone and earth filling.
	Market Basin cribseats.....	16	12,150	Gravel and stones.
	Victoria Pier cribseats.....	38½	39,350	Gravel and stones.
	Maintenance in basins.....	14	18,917	Rubbish.
	Inside Guard Pier.....	180¾	173,270	Blasted rock, earth and gravel.
	Cribseats Sec. 27-28.....	20	6,400	Hard pan and stones.
	Elgin Basin Maintenance.....	14		Sewage material.
	Miscellaneous construction and wrecking work.....	26¼	348½	
Dredge Premier.....	Between Isle Verte and Guard Pier.....	166	12,180	Gravel, hard pan and boulders.
Dredge Algonquin.....	Maintenance of basins.....	2	600	Debris.
	Inside Guard Pier.....	113	92,400	Unblasted rock and hard pan.
	GRAND TOTAL.....	1,685¼	1,427,917	





CITY OF MONTREAL

CANADA.  
PLAN OF  
**THE HARBOUR OF MONTREAL**  
FROM VICTORIA BRIDGE TO LONGUE POINTE

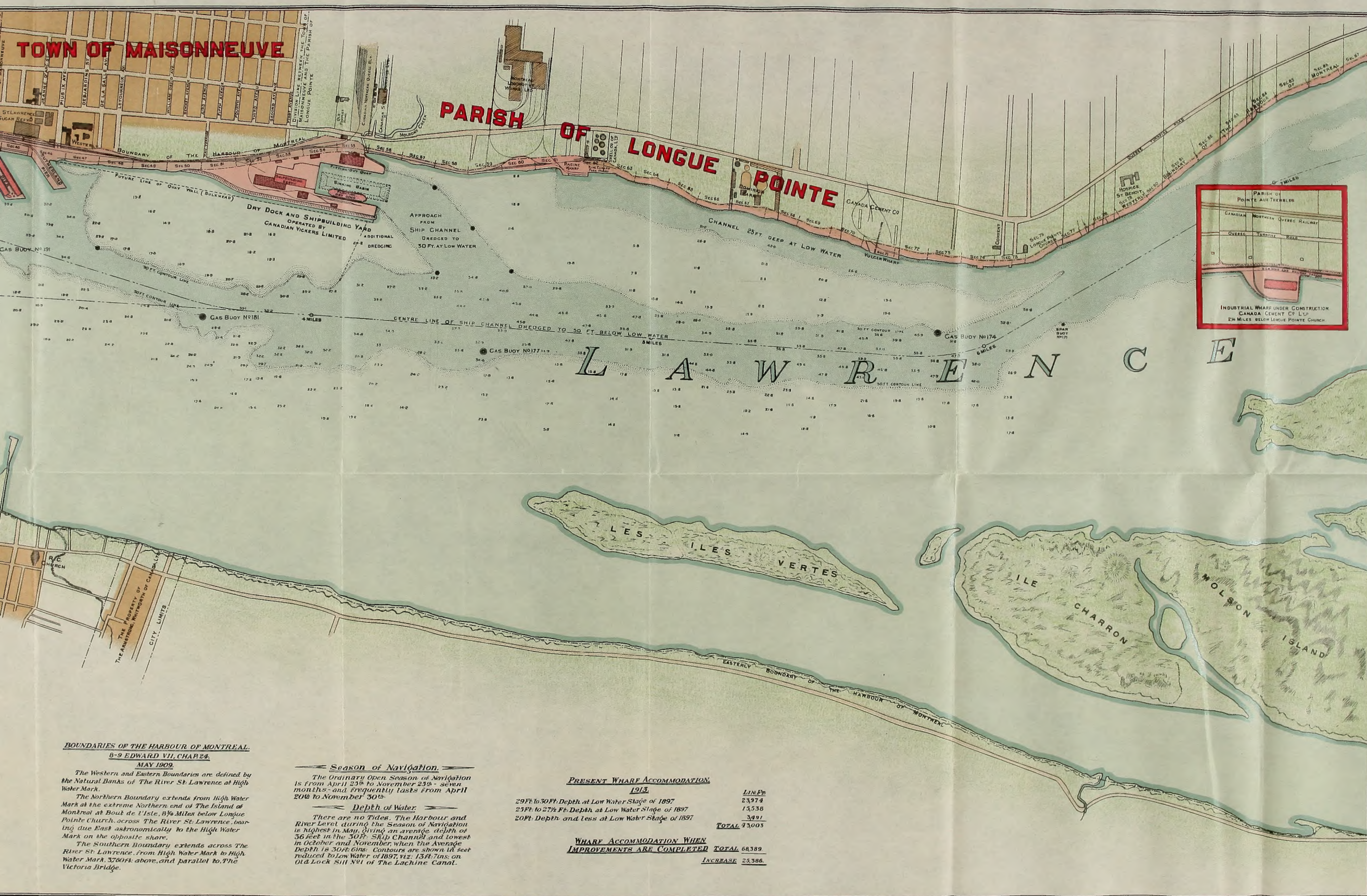
HARBOUR COMMISSIONERS OF MONTREAL,

PRESIDENT.  
W.G. ROSS ESQ.  
FAROUKH ROBERTSON ESQ. COL. A.E. LABELLE.  
MAJOR DAVID SEATH, SECRETARY.  
FREDERICK W. COWIE, M. INST. C.E. CHIEF ENGINEER.

1914.







**BOUNDARIES OF THE HARBOUR OF MONTREAL.**  
8-9 EDWARD VII, CHAP 24.  
MAY 1909.

The Western and Eastern Boundaries are defined by the Natural Banks of the River St. Lawrence at High Water Mark.

The Northern Boundary extends from High Water Mark at the extreme Northern end of the Island of Montreal at Bouk de l'Isle, 8 1/2 Miles below Longue Pointe Church, across the River St. Lawrence, bearing due East astronomically to the High Water Mark on the opposite shore.

The Southern Boundary extends across the River St. Lawrence, from High Water Mark to High Water Mark, 3760 ft. above, and parallel to the Victoria Bridge.

**Season of Navigation.**

The Ordinary Open Season of Navigation is from April 25th to November 25th - seven months - and frequently lasts from April 20th to November 30th.

**Depth of Water.**

There are no Tides. The Harbour and River Level during the Season of Navigation is highest in May, giving an average depth of 36 feet in the 30 ft. Ship Channel and lowest in October and November when the Average Depth is 30 ft. 6 ins. Contours are shown in feet reduced to Low Water of 1897, viz. 13 ft. 7 ins. on Old Lock Sill No 1 of the Lachine Canal.

**PRESENT WHARF ACCOMMODATION.**  
1913.

29 Ft. to 30 Ft. Depth at Low Water Stage of 1897  
25 Ft. to 27 1/2 Ft. Depth at Low Water Stage of 1897  
20 Ft. Depth and less at Low Water Stage of 1897

LINE-Ft.
23,974
15,536
3,491
<b>TOTAL 43,003</b>

**WHARF ACCOMMODATION WHEN IMPROVEMENTS ARE COMPLETED.**

**TOTAL 68,389.**  
**INCREASE 25,386.**









